

Proj
file
copy



DELIVERABLE 224C

SALTCRETE WASTE CHARACTERIZATION REPORT

FOR

ADMIN RECORD

EG&G ROCKY FLATS

PREPARED BY

HALLIBURTON NUS ENVIRONMENTAL CORPORATION

INTERNAL DRAFT

JULY 1992

DOCUMENT CLASSIFICATION
REVIEW WAIVER PER
CLASSIFICATION OFFICE

"REVIEWED FOR CLASSIFICATION

By

Date

u/pw

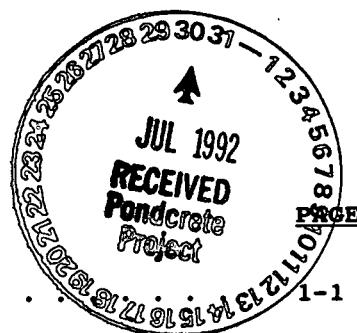
Jan

7-29-92



HALLIBURTON NUS
Environmental Corporation

TABLE OF CONTENTS



1.0 INTRODUCTION	1-1
1.1 Authorization	1-1
1.2 Background	1-1
1.3 Scope of Work	1-2
2.0 SAMPLING AND ANALYSIS PROGRAM	2-1
2.1 Sampling Locations	2-1
2.2 Sampling Procedures	2-11
2.3 Analytical Program	2-11
2.3.1 Laboratory Analyses	2-11
2.3.2 Field Measurements	2-15
2.4 Data Validation and Evaluation	2-15
3.0 ANALYTICAL DATA EVALUATION	3-1
3.1 Field Measurements	3-1
3.2 Triwall Analytical Data	3-1
3.3 Half Crate Analytical Data	3-9
3.4 Metal Container Analytical Data	3-12
3.5 Composite Analytical Data	3-12
4.0 SUMMARY AND CONCLUSIONS	4-1
4.1 Regulatory Compliance	4-1
4.2 Evaluation of Saltcrete Populations	4-7
4.3 Conclusions	4-14

REFERENCE

APPENDICES

- A - Summary of Proposed Saltcrete Sample Collection Compared with Actual Sample Collection
- B - Analytical Database
- C - Data Validation Cover Letters
- D - Field Log Book
- E - Chain-if-Custody Forms
- F - Calculations to Determine If RCRA Standards Are Exceeded

TABLE OF CONTENTS (Con'd)

	<u>PAGE</u>	
<u>TABLES</u>		
1-1	Approximate Composition of Salt Prior to Plutonium Production Operations Shutdown (December 1989)	1-3
2-1	Saltcrete Sampling Summary	2-3
2-2	Triwall Sample Collection Summary - Saltcrete	2-6
2-3	Half Crates Sample Collection Summary - Saltcrete	2-9
2-4	Metals Sample Collection Summary - Saltcrete	2-10
2-5	Summary of Analysis Program	2-12
3-1	Field Data Summary	3-2
3-2	Summary of Saltcrete Characterization Data -	3-7
3-3	Triwall Summary of Saltcrete Characterization Data -	3-10
3-4	Half Crate Summary of Saltcrete Characterization Data -	3-13
3-5	Metal Summary of Saltcrete Characterization Data -	3-15
	Composites	
4-1	LDR Treatment Standards - Saltcrete	4-2
4-2	Saltcrete Samples Exceeding LDR Standards	4-5
4-3	Metal Container Samples Exceeding LDR Standards . . .	4-6
4-4	Triwall Samples Exceeding LDR Standards	4-8
<u>FIGURES</u>		
2-1	The Proposed and Actual Number of Saltcrete Samples Collected by Location Within the Confines of Pad 904	2-4
2-2	The Proposed and Actual Number of Saltcrete Samples Collected By Location Within the Confines of Pad 750	2-5
4-1	Historical Salt Loading of Triwalls	4-10
4-2	Historical Salt Loading of Half Crate	4-12
4-3	Historical Salt Loading of Metals	4-13

1.0 INTRODUCTION

1.1 AUTHORIZATION

This report has been prepared by HALLIBURTON NUS Environmental Corporation (HALLIBURTON NUS) as part of EG&G Subcontract Number PC84017JB. This report is defined as Deliverable Number 224C . The purpose of this report is to summarize and evaluate the characterization data collected for saltcrete in the following waste forms:

- Triwalls
- Half-crates
- Triwalls in metal containers

1.2 BACKGROUND

Saltcrete is generated by solidifying the nitrate salt residue which is formed in an evaporation process at the Liquid Waste Treatment Facility located in building 374 of the Rocky Flats plant in Golden, Colorado. In simplified terms, the 374 wastewater treatment operation can be broken into three processes. Depending on its radiological contamination and point of origin, wastewater can go straight into any one of the three treatment processes; however, inside the facility, the processes are interrelated. The three basic processes are:

- (1) Evaporation
- (2) Flocculation/precipitation
- (3) Sludge dewatering

The flocculation/precipitation activity is designed for the removal of radioactive material. The settled sludge from this process goes to the sludge handling step and the overflow goes to the evaporator. The evaporator also receives less contaminated wastewater directly. The residue or concentrated salt solution from the evaporator is a 35 percent nitrate salt solution which is subsequently dried in a spray dryer. The spray dried salts are mixed with cement to immobilize particulates and remove the oxidizer and corrosive characteristics of the salt and/or concentrated salt solutions. The resulting waste form is referred to as Saltcrete (Rockwell International, 1989).

The saltcrete process was developed in 1985. The process combined 55 wt% salt, 18 wt% cement and 27 wt% water with a water to cement ratio of 1.5. Shipping delays caused the need for the solidified blocks to be stored on site. This

outside storage, combined with the high waste loading and high water to cement ratio, ultimately caused some blocks to fail. In June of 1989 the formulation was changed to incorporate additional cement which yielded a formulation of approximately 51.3 wt% salt, 22.2 wt% cement and 26.5 wt% water with a water to cement ratio of 1.19. However, this new formulation also began to fail due to expansion.

Originally, the salt was a waste created from the plutonium production operations. This waste contained a high amount of nitrate compounds and has an approximate composition as given in Table 1-1. The plutonium production operations were halted in December of 1989, as a result of this, the chemical makeup of the salt produced after the shutdown differs significantly from the original salt. No high nitrate waste streams were incorporated into the salt after this change in waste by-products produced.

HALLIBURTON NUS has been awarded a contract to stabilize the various forms of saltcrete located at the Rocky Flats Facility. One of the initial tasks of the project was the collection and analysis of the various forms of saltcrete samples to support the development of stabilization recipes. Specific goals of the saltcrete characterization program were as follows:

- Characterize the various forms of saltcrete.
- Determine the variability of constituents in each media within a saltcrete form.
- Determine the variability of constituents in each media between the various saltcrete forms.
- Evaluate the compatibility of the various saltcrete forms to support any design options that include saltcrete consolidation.

1.3 SCOPE OF WORK

The scope of work for the saltcrete pond characterization effort is defined in the Combined Deliverable Number 211B, 211C, 221B, and 221C, the "Pondcrete Sampling Plan, Saltcrete Sampling Plan, Pondcrete Analysis Plan, and Saltcrete Analysis Plan." This deliverable was prepared by HALLIBURTON NUS and approved by EG&G Rocky Flats in October 1991. Deliverable 212C, Saltcrete Sampling Procedure, provided the detailed sampling instructions for the various forms of saltcrete. This deliverable was issued in November 1991.

TABLE 1-1
 APPROXIMATE COMPOSITION OF SALT PRIOR TO
 PLUTONIUM PRODUCTION OPERATIONS SHUTDOWN
 (DECEMBER 1989)

NaNO_3	Sodium Nitrate	44.3 wt%
KNO_3	Potassium Nitrate	27.7 wt%
NaCl	Sodium Chloride	7.8 wt%
KCl	Potassium Chloride	1.8 wt%
Na_2SO_4	Sodium Sulphate	4.5 wt%
K_2SO_4	Potassium Sulphate	1.4 wt%
Na_3PO_4	Sodium Phosphate	0.8 wt%
K_3PO_4	Potassium Phosphate	0.4 wt%
Na_2CO_3	Calcium Hydroxide	6.8 wt%
$\text{Ca}(\text{OH})_2$	Calcium Hydroxide	4.5 wt%

7

1

2.0 SAMPLING AND ANALYSIS PROGRAM

2.1 SAMPLING LOCATIONS

The Sampling and Analysis Plan (HALLIBURTON NUS, October 1991) specified the collection of 60 discrete samples from the total population of Saltcrete (approximately 3,000 billets). The Saltcrete population was subdivided into three groups; triwalls, half crates, and metal containers. Metal containers store triwalls that are damaged and store 2 to 3 triwalls. The number of samples collected from each subgroup was determined by proportioning the total number of samples between the three subgroups based on the total number in each subgroup. The proposed number of samples to be collected per subgroup was also proportionally divided between the 904 Pad and 750 Pad.

The primary difference between triwalls and half crates is that the triwalls were reported to contain a waste loading of 50 to 55 percent and the half crates have a waste loading of 33 to 35 percent. The waste loading consists primarily of nitrate salts. Triwalls were produced prior to April 1989 and half crates were produced from that time on. Additionally, it was reported that the waste loading may have changed over the production of triwalls and/or the half crates, therefore; it was necessary to obtain samples which were spaced throughout the time of production for each subgroup.

One of the primary concerns of the sampling effort was to ensure that the samples were randomly selected. To ensure random sample selection the samples were selected using a multi-stage cluster sampling approach. The following approach was conducted for each subgroup and consisted of first determining all possible storage tents for a particular pad, then determining all possible storage stacks within each tent, and finally determining all possible sampling locations for each stack. This information was provided on maps which described each tent and stack within a tent for both the 904 and 750 Pad. These maps were provided in the Sampling and Analysis Plan in Appendix A and Appendix B which correspond to Pad 904 and Pad 750, respectively.

The location of each sample that was to be collected, for each subgroup, was determined using a random number generation process. The process consisted of using a random number generator to first select a tent, then a stack, and finally a sample location.

Once all of the sample locations were selected, maps depicting the tents, stacks, and locations were provided to EG&G. EG&G personnel then identified the production date of each billet that was selected for sample collection. These dates were then provided to HALLIBURTON NUS who verified that the billets selected for sample collection were adequately dispersed throughout the production time to determine if any significant variances in waste loadings occurred for triwalls or half crates.

Prior to commencement of the sampling activities, EG&G personnel mobilized all of the selected saltcrete billets, via forklift, from its respective storage location to Tent 10 and placed them inside the Permacon for sampling. All sampling was conducted inside of the Permacon to contain any contamination.

Table 2-1 compares the proposed samples which were selected for collection with the actual samples that were collected in the field by pad number and subgroup/container type. Figures 2-1 and 2-2 show Saltcrete storage facilities for Pad 904 and 750, respectively. Figures 2-1 and 2-2 also present the proposed and actual number of Saltcrete samples collected by location (i.e., lay down area or tent number, and stack identification). Additional details of the sampling effort is provided in Appendix A.

Review of Figures 2-1 and 2-2 along with Appendix A indicates that problems with tracking saltcrete billet origins were encountered during the actual sampling activities. Unconfirmed sample locations maybe attributed to the following:

- HALLIBURTON NUS personnel were not permitted to accompany EG&G forklift operator(s) into Saltcrete storage areas in order to confirm each billet's identity and secure the sample location information.
- Some billets designated for sampling were never relocated due to ongoing redistribution within the overall storage facility.
- Only a partial sample origin description was found on some billets brought into the processing area.

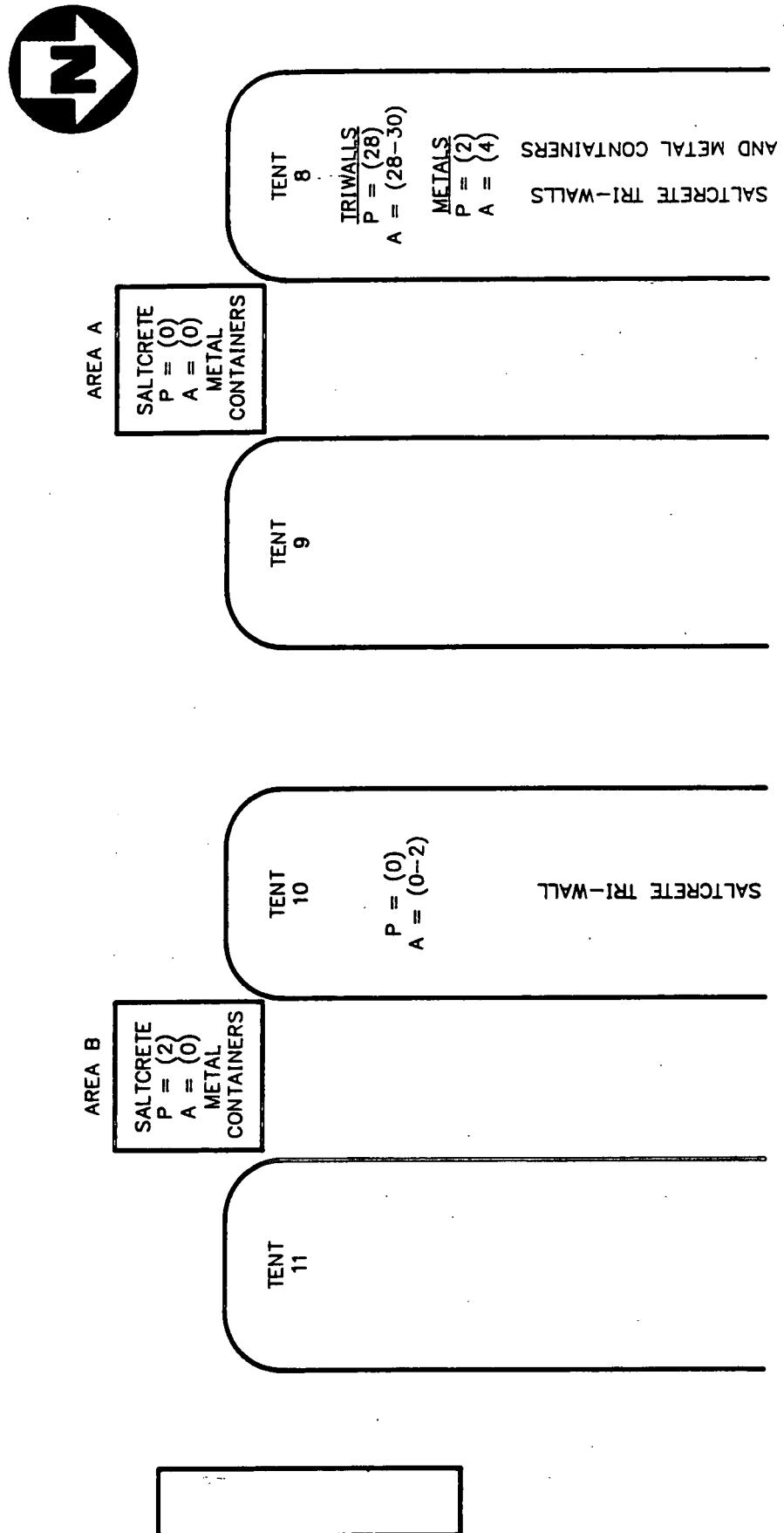
Tables 2-2, 2-3, and 2-4 summarize the samples collected for triwalls, half crates, and metals. Also provided in the tables are the production dates (accumulation date) of the Saltcrete billets.

TABLE 2-1

SALTCRETE SAMPLING SUMMARY
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO

Subgroup/ Container Type	904 Pad			750 Pad			Samples from Unconfirmed Pad Location
	Proposed No. of Samples	Confirmed No. of Samples	Figure References in Text	Proposed No. of Samples	Confirmed No. of Samples	Figure References in Text	
Triwall	28	29	2-1	14	12	2-2	1
Half crate	0	0	NA	12	12	2-2	0
Triwall in Metal Container	4	4	2-1	2	2	2-2	0

NA - Not Applicable

**LEGEND**

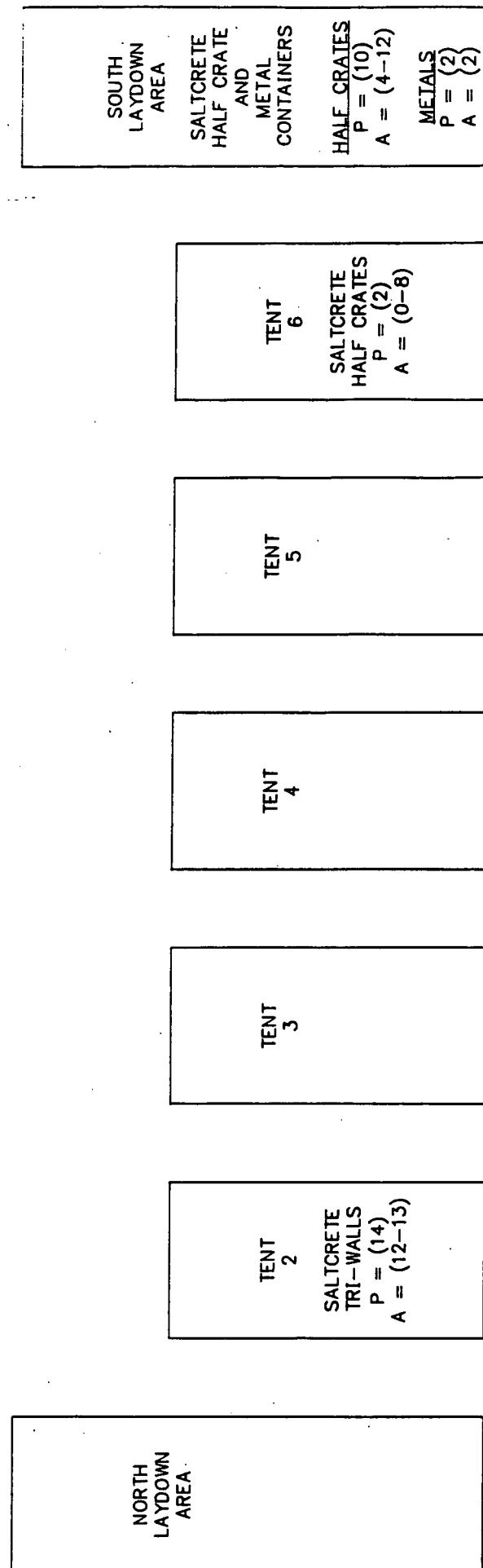
P = NUMBER OF PROPOSED SAMPLES
A = ACTUAL NUMBER OF SAMPLES COLLECTED

THE PROPOSED AND ACTUAL NUMBER OF
SALTCRETE SAMPLES COLLECTED BY LOCATION
WITHIN THE CONFINES OF PAD 904

ROCKY FLATS, COMPLEX, COLORADO

NOT TO SCALE

FIGURE 2-1



LEGEND

P = NUMBER OF PROPOSED SAMPLES
A = ACTUAL NUMBER OF SAMPLES COLLECTED

THE PROPOSED AND ACTUAL NUMBER OF SALTCRETE SAMPLES COLLECTED BY LOCATION WITHIN THE CONFINES OF PAD 750 ROCKY FLATS COMPLEX, COLORADO

FIGURE 2-2

TABLE 2-2
TRIWALL SAMPLE COLLECTION SUMMARY - SALTCRETE
SOLAR POND/PONDRETE PROJECT
ROCKY FLATS PLANT, COLORADO

Sample Number	Triwall No.	Container Type	Sample Type	Date Sampled	Accumulation Date
SC-02408-T-T	NA	NA	TRIP BLANK(1)	01-13-92	NA
SC-02408-T	03873	TRIWALL	ROUTINE	01-13-92	05-17-88
SC-03408-T	03912	TRIWALL	ROUTINE	01-13-92	05-22-88
SC-03408-T-D	03912	TRIWALL	DUPLICATE	01-13-92	05-22-88
SC-04408-T	03874	TRIWALL	ROUTINE	01-13-92	05-17-88
SC-05410-T	03890	TRIWALL	ROUTINE	01-13-92	05-19-88
SC-06410-T	03956	TRIWALL	ROUTINE	01-13-92	06-23-88
SC-07408-T	04226	TRIWALL	ROUTINE	01-14-92	08-06-88
SC-08408-T	13524	TRIWALL	ROUTINE	01-14-92	09-28-87
SC-09408-T	NC	TRIWALL	ROUTINE	01-14-92	07-04-88
SC-10408-T	04031	TRIWALL	ROUTINE	01-14-92	07-07-88
SC-11408-T	04059	TRIWALL	ROUTINE	01-14-92	07-04-88
SC-12408-T	04436	TRIWALL	ROUTINE	01-14-92	10-10-88
SC-13408-T	03831	TRIWALL	ROUTINE	01-14-92	05-13-88
SC-14408-T	03937	TRIWALL	ROUTINE	01-14-92	06-20-88
SC-14408-T-T-W	NA	NA	TRIP BLANK (2)	01-15-92	NA
SC-14408-T-F	NA	NA	FIELD BLANK	01-15-92	NA
SC-14408-T-B	NA	NA	RINSATE BLANK	01-15-92	NA
SC-15408-T-T	NA	NA	TRIP BLANK (1)	01-15-92	NA
SC-15408-T	04174	TRIWALL	ROUTINE	01-15-92	08-17-88
SC-16408-T	04162	TRIWALL	ROUTINE	01-15-92	08-09-88
SC-17408-T	02828	TRIWALL	ROUTINE	01-15-92	04-10-87
SC-185XX-T	02225	TRIWALL	ROUTINE	01-15-92	10-13-86
SC-195XX-T	03011	TRIWALL	ROUTINE	01-15-92	05-22-87
SC-205XX-T	02585	TRIWALL	ROUTINE	01-16-92	02-02-87
SC-215XX-T	02237	TRIWALL	ROUTINE	01-16-92	12-23-86

TABLE 2-2
TRIWALL SAMPLE COLLECTION SUMMARY - SALTCRETE
PAGE 2

Sample Number	Triwall No.	Container Type	Sample Type	Date Sampled	Accumulation Date
SC-02408-T-T	NA	NA	TRIP BLANK(1)	01-13-92	NA
SC-225XX-T	03137	TRIWALL	ROUTINE	01-16-92	07-10-87
SC-23408-T	03456	TRIWALL	ROUTINE	01-16-92	09-22-87
SC-24408-T	04084	TRIWALL	ROUTINE	01-16-92	07-07-88
SC-25408-T	02549	TRIWALL	ROUTINE	01-16-92	01-02-87
SC-26408-T	03653	TRIWALL	ROUTINE	01-16-92	10-29-87
SC-275XX-T	03125	TRIWALL	ROUTINE	01-16-92	07-10-87
SC-285XX-T	NC	TRIWALL	ROUTINE	01-16-92	06-25-89
SC-29408-T	04160	TRIWALL	ROUTINE	01-16-92	08-05-88
SC-30408-T	02793	TRIWALL	ROUTINE	01-16-92	04-05-87
SC-31XXX-T-T	N/A	N/A	TRIP BLANK (1)	01-20-92	NA
SC-31XXX-T	03440	TRIWALL	ROUTINE	01-20-92	09-20-87
SC-325XX-T	02410	TRIWALL	ROUTINE	01-20-92	07-10-87
SC-33XXX-T	03018	TRIWALL	ROUTINE	01-20-92	05-28-87
SC-34XXX-T	02539	TRIWALL	ROUTINE	01-20-92	12-26-86
SC-355XX-T	03037	TRIWALL	ROUTINE	01-20-92	05-27-87
SC-355XX-T-T-W	NA	NA	TRIP BLANK (2)	01-20-92	NA
SC-355XX-T-F	NA	NA	FIELD BLANK	01-20-92	NA
SC-355XX-T-B	NA	NA	RINSATE BLANK	01-20-92	NA
SC-36408-T	04634	TRIWALL	ROUTINE	01-20-92	12-11-88
SC-37408-T	03817	TRIWALL	ROUTINE	01-20-92	05-13-88
SC-37408-T-D	03817	TRIWALL	DUPLICATE	01-20-92	05-13-88
SC-38408-T	03886	TRIWALL	RINSATE	01-20-92	05-19-88
SC-39408-T	04381	TRIWALL	ROUTINE	01-20-92	10-04-88
SC-424XX-T	04440	TRIWALL	ROUTINE	01-20-92	10-08-88
SC-424XX-T-F	NA	NA	FIELD BLANK	01-20-92	NA

TABLE 2-2
TRIWALL SAMPLE COLLECTION SUMMARY - SALTCRETE
PAGE 3

Sample Number	Triwall No.	Container Type	Sample Type	Date Sampled	Accumulation Date
SC-02408-T-T	NA	NA	TRIP BLANK(1)	01-13-92	NA
SC-435XX-T	03287	TRIWALL	ROUTINE	01-20-92	06-07-87
SC-435XX-T-D	03287	TRIWALL	DUPLICATE	01-20-92	06-07-87
SC-445XX-T	03093	TRIWALL	ROUTINE	01-20-92	UNKNOWN
SC-445XX-T-B	NA	NA	RINSATE BLANK	01-20-92	NA

KEY

- (1) Trip Blank accompanied Routine and Duplicate Saltcrete Samples.
- (2) Trip Blank accompanied Aqueous samples (i.e., Rinsate & Field Blanks).
- SLA South Laydown Area.
- NA Not Applicable
- NC No confirmed triwall number.

TABLE 2-3

**HALF CRATES SAMPLE COLLECTION SUMMARY - SALTCRETE
SOLAR POND/PONDRETE PROJECT
ROCKY FLATS PLANT, COLORADO**

Sample Number	Container ID	Trimall No.	Container Type	Sample Type	Date Sampled	Accumulation Date
SC-455XX-H	776-A-5560	NA	HALF CRATE	ROUTINE	01-01-92	06-29-89
SC-455XX-H-D	776-A-5560	NA	HALF CRATE	DUPLICATE	01-27-92	06-29-89
SC-455XX-H-T	NA	NA	NA	TRIP BLANK (1)	01-27-92	NA
SC-465XX-H	748-00032	NA	HALF CRATE	ROUTINE	01-27-92	12-15-89
SC-465XX-H-T-W	NA	NA	NA	TRIP BLANK (1)	01-27-92	NA
SC-475XX-H	H00264	NA	HALF CRATE	ROUTINE	01-27-92	04-08-90
SC-485XX-H	H03453	NA	HALF CRATE	ROUTINE	01-27-92	04-05-91
SC-485XX-H-F	NA	NA	NA	FIELD BLANK	01-20-92	NA
SC-485XX-H-B	NA	NA	NA	RINSATE BLANK	01-27-92	NA
SC-495XX-H	H03202	NA	HALF CRATE	ROUTINE	01-27-92	UNKNOWN
SC-505XX-H	H00198	NA	HALF CRATE	ROUTINE	01-27-92	UNKNOWN
SC-515XX-H	748-00466	NA	HALF CRATE	ROUTINE	01-28-92	09-30-91
SC-525XX-H	776-A-6189	NA	HALF CRATE	ROUTINE	01-28-92	06-28-89
SC-535XX-H	H0776-A-5441	NA	HALF CRATE	ROUTINE	01-28-92	UNKNOWN
SC-545XX-H	H00277	NA	HALF CRATE	ROUTINE	01-28-92	04-09-90
SC-555XX-H	H03509	NA	HALF CRATE	ROUTINE	01-28-92	05-09-91
SC-565XX-H	H03211	NA	HALF CRATE	ROUTINE	01-28-92	12-18-90

KEY

- (1) Trip Blank accompanied Routine and Duplicate Saltcrete Samples.
- (2) Trip Blank accompanied Aqueous samples (i.e., Rinsate & Field Blanks).
- SLA South Laydown Area.
- NA Not Applicable

TABLE 2-4

**METALS SAMPLE COLLECTION SUMMARY - SALTCRETE
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO**

Sample Number	Container ID	Triwall No.	Container Type	Sample Type	Date Sampled	Accumulation Date
SC-57408-M	M00661	02739	METAL	ROUTINE	01-28-92	03-22-87
SC-58408-M	M00661	02704	METAL	ROUTINE	01-28-92	04-07-87
SC-595XX-M-T	NA	NA	NA	TRIP BLANK(1)	01-30-92	NA
SC-595XX-M	M00424	748-03257	METAL	ROUTINE	01-30-92	07-21-89
SC-605XX-M	M00424	748-3226	METAL	ROUTINE	01-30-92	07-12-89
SC-41408-M	M00818	04099	METAL	ROUTINE	01-21-92	01-06-87
SC-41408-M-D	M00818	04099	METAL	DUPLICATE	01-20-92	01-06-87
SC-41408-M-F	NA	NA	NA	FIELD BLANK	01-20-92	NA
SC-41408-M-B	NA	NA	NA	RINSATE BLANK	01-20-92	NA

KEY

- (1) Trip Blank accompanied Routine and Duplicate Saltcrete Samples.
NA Not Applicable

In addition to the samples associated with unique triwalls, metal containers, and half crates, a composite sample was produced. In all, three composite samples were produced and analyzed, one for triwalls, metal containers, and half crates. The sample was taken by combining an aliquot of the characterization samples, homogenizing and taking the sample from this material. Therefore, the composite samples taken represent an average of their respective populations.

2.2 SAMPLING PROCEDURES

Sampling was conducted in accordance with combined Deliverable 211B, 211C, 221B and 221C, "Saltcrete Sampling and Analysis Plan" and Deliverable 212C, "Saltcrete Inventory Sampling Procedure". All samples were collected by EG&G personnel with the exception of trip blanks which were provided by the analytical laboratory. HALLIBURTON NUS provided personnel to assist in sample bottle labelling, preparing the chain-of-custody forms and maintaining the field log book during each shift that EG&G personnel obtained Saltcrete samples. HALLIBURTON NUS' personnel were not trained to enter the permacon and therefore observed sampling activities through a viewing port. The responsibility for filling out sample data sheets was assigned to trained EG&G personnel who were inside of the permacon during sampling. Additionally, Mr. Jack Templeton (Brown & Root, Inc.) was EG&G trained for permacon entry where he inspected or oversaw the inspection of the contents of each triwall container. When there was a shortage of EG&G personnel available for permacon entry, Mr. Templeton filled out the sample data sheets.

As mentioned all sampling was conducted in accordance with Deliverable 212C. Any deviation from the procedures due to conditions encountered in the field are documented in the field log book (Appendix D). A summary of the equipment employed in the collection of both chemical and physical portions of each Saltcrete sample is provided in Appendix A. Copies of the chain-of-custody forms and the sample data sheets can be found in Appendix E and F, respectively.

2.3 ANALYTICAL PROGRAM

2.3.1 Laboratory Analyses

The laboratory analytical program for Saltcrete is summarized in Table 2-5. The rational for selecting these parameters was to provide input to the solidification formula development and was required to address various regulatory concerns, mainly the Land Disposal Restrictions (LDRs) from 40 CFR 268. An

TABLE 2-5

**SUMMARY OF ANALYSIS PROGRAM
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO**

Analyses	Target Detection Limit	Analytical Method		DQO Level (1)
Chemical Characterization		Saltcrete	Extracts	
Selected VOAs (2)	Per Method	SW 8240	---	IV
Selected Semivolatiles (2)	Per Method	SW 3550/8270	---	IV
Selected Alcohols (2)	Per Method	ASTM D 3695-82	---	IV
Arsenic	Per Method	SW 3050/6010	---	IV
Barium	Per Method	SW 3050/6010	---	IV
Boron	Per Method	SW 3050/6010	---	IV
Cadmium	Per Method	SW 3050/6010	---	IV
Chromium, Total	Per Method	SW 3050/6010	---	IV
Lead	Per Method	SW 3050/6010	---	IV
Mercury	Per Method	SW 7471	---	IV
Nickel	Per Method	SW 3050/6010	---	IV
Selenium	Per Method	SW 3050/6010	---	IV
Silver	Per Method	SW 3050/6010	---	IV
Magnesium	Per Method	SW 3050/6010	---	IV
Sodium	Per Method	SW 3050/6010	---	IV
Potassium	Per Method	SW 3050/6010	---	IV
Cement Content (Ca/Al/Fe)	Per Method	SW 3050/6010	SW 3010/6010	III
Ammonia	1 mg/kg	EPA 350.2	---	III
pH	---	SW 9045	---	III
Cyanide (Total & Amenable)	Per Method	ASTM D 2036	ASTM D 2036	IV
Total Organic Carbon	1 mg/kg & 1 mg/l	Walkley-Black	EPA 415.1	III
TCLP Leach	Per Method	SW 1311	SW 1311	---
Arsenic	Per Method	---	SW 3010/6010	IV
Barium	Per Method	---	SW 3010/6010	IV
Cadmium	Per Method	---	SW 3010/6010	IV

TABLE 2-5
SUMMARY OF ANALYSIS PROGRAM
SOLAR POND/PONCRETE PROJECT
PAGE 2

Analyses	Target Detection Limit	Analytical Method		DQO Level (1)
Chemical Characterization		Saltcrete	Extracts	
Chromium (Total)	Per Method	---	SW 3010/6010	IV
Lead	Per Method	---	SW 3010/6010	IV
Mercury	Per Method	---	SW 7470	IV
Nickel	Per Method	---	SW 3010/6010	IV
Selenium	Per Method	---	SW 3010/6010	IV
Silver	Per Method	---	SW 3010/6010	IV
pH	---	---	EPA 150.1	III
ASTM Leach	---	ASTM D 3987-85	---	---
Phosphate (Ortho)	0.01 mg/l	---	EPA 365.2	III
Sulfate	1.0 mg/l	---	EPA 375.4	III
Nitrate	0.1 mg/l	---	EPA 353.2	III
Chloride	2 mg/l	---	EPA 325.3	III
TDS	1 mg/l	---	EPA 160.1	III
Geotechnical Parameters				
Moisture				
Karl Fisher Method	---	ASTM E203	---	III
Gravimetric Method	---	ASTM D2216	---	III
Bulk Density	---	Agronomy No. 9 Chapt. 30	---	III
Specific Gravity	---	ASTM D 854/ D 1429	---	III
Viscosity	---	ASTM D 1084	---	III
Atterberg Limits	---	ASTM D 4318	---	III
Particle Size	---	ASTM 436-84a	---	III
Swell Test	---	FREE SWELL TEST (HOLTZ & GIBBS, 1956)	---	III

TABLE 2-5
SUMMARY OF ANALYSIS PROGRAM
SOLAR POND/PONDCRETE PROJECT
PAGE 3

Analyses	Target Detection Limit	Analytical Method		DQO Level (1)
Chemical Characterization		Saltcrete	Extracts	
Unconfined Compressive Strength (UCS)	---	ASTM C39-86	---	III
Petrographic Analysis	---	N/A	---	III
Rad Parameters				
Gross Alpha & Gross Beta	---	SW 3050/EPA 900.0	---	III

Key

- (1) Deliverables for DQO Level IV parameters are as close to CLP as possible. Deliverables for DQO Level III parameters include signed and dated chain-of-custody forms, calculations, copies of analyst logbooks, and data summaries.
- (2) F001, F002, F003, and F005 (spent solvents) Land Disposal Restrictions (LDR) analytes.

<u>Select VOAs</u>	<u>Select Semivolatiles</u>	<u>Select Alcohols</u>
Tetrachloroethene	Cyclohexanone	N-butyl Alcohol
Trichloroethene	Pyridine	Methanol
Methylene Chloride	2-Nitropropane	Isobutanol
1,1,1-Trichloroethane	1,2-Dichlorobenzene	2-Ethoxyethanol
Carbon Tetrachloride		
Chlorobenzene		
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)		
-Trichlorofluoromethane		
1,1,2-Trichloroethane		
Xylenes (Total)		
Acetone		
Ethyl Acetate		
Ethylbenzene		
Ethyl Ether		
Methyl Isobutyl Ketone		
Toluene		
Methyl Ethyl Ketone		
Carbon Disulfide		
Benzene		

overview of the LDRs, and specific analyses and rationale was provided in Section 1.4 of the combined Saltcrete and Pondcrete Sampling and Analysis Plan (Combined Deliverable 211B, 211C, 221B, and 221C).

Analysis of select VOAs, select semi-volatiles, select alcohols, metals, cyanide, and TCLP parameters were conducted to achieve a data quality objective Level IV. This provides data of a quality similar to that required for CLP (i.e., legally defensible data). All other parameters are considered engineering data and only require a DQO level of III.

2.3.2 Field Measurements

EG&G employed a penetrometer to obtain five compressive strength measurements per Saltcrete sample. Readings were taken at the center and four quadrants on the exposed face of the triwall and half crate. These results are provided in Section 3.0.

2.4 DATA VALIDATION AND EVALUATION

All laboratory analytical data were subjected to the process of data validation. Formal data validation is a systematic review and evaluation of data that serves as an independent QC check of the laboratory results. It is also a means of evaluating laboratory performance and determining the impact, if any, or non-compliances of the data. Through the use of data qualifiers, validation lends interpretive guidance concerning proper usage and limitations of the data.

Data validation was conducted in accordance with the EPA "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" and "Laboratory Data Validation Functional Guidelines for Evaluating Organic (and Inorganic) Analyses" as applied for use within EPA Region VIII. The validation performed on Saltcrete characterization samples was the same as, which would be performed on Contract Laboratory Protocol (CLP) samples.

Internal memoranda documenting the validation process were prepared and are included in Appendix C. These memoranda explain the findings of the validation process, interpret the actions taken on the data, and summarize the data qualifiers assigned. The results of the validation process have been entered into the database in Appendix C.

Saltcrete summary tables were prepared to facilitate review and interpretation of the data. These tables are included in Section 3.0. The tables include

information on the frequency of positive detections within the total sample set, the range of positive detections, the mean concentration, the standard deviation, and the relative standard deviation. The presentation and interpretation of data is relatively straight forward when a given analyte is detected in all the samples. However, the situation is complicated when analytes are detected in some samples but not in others. Even though quantitation was not possible at the stated detection limit in a given sample, it does not necessarily mean that the analyte was not present. It is possible that the analyte is present, but at a concentration less than the quantitation limit. This problem is exacerbated when the detection limits are elevated because of matrix interferences.

EPA has recognized the problem, especially where analytical data are used as the bases for quantitative risk assessment. Current guidance (USEPA, 1989) calls for assigning a value of one half the detection limit to non-detect samples for statistical analysis. This is not a perfect solution, and it can produce apparent inconsistencies in the data. For instance, it is possible for a mean concentration to be higher than the maximum quantitated value. This can result when elevated detection limits result in a nondetect value reported by the laboratory, but one half the detection limit being higher than any of the positive quantitations. For this reason, the mean, standard deviation, and the relative standard deviation must be evaluated with consideration of the frequency of detection and the detection limits of non-detect analyses. The database in Appendix B includes the quantitation limits for all non-detect analyses.

3.0 ANALYTICAL DATA EVALUATION

3.1 FIELD MEASUREMENTS

During saltcrete sampling, visual observations of individual saltcrete samples were made. Also, penetrometer readings were taken on the top and four sides of each sample. The important observations and the penetrometer data are summarized in Table 3-1.

3.2 TRIWALL ANALYTICAL DATA

A total of 42 triwalls plus three duplicates were analyzed for characterization of this population. The triwall analytical data are summarized in Table 3-2.

Eight individual volatile organic analytes were detected in one or more samples. The most frequently detected compounds were 2-butanone, detected in ten samples, and toluene, detected in eleven samples. Acetone was detected at the highest concentrations, but in only six of the samples. None of the volatile organics were present at concentrations that could exceed their respective LDR standards in the TCLP ZHE leachate, conservatively assuming that all of the volatile compound would leach.

No target semi-volatile organics or alcohols were detected in any of the samples.

All of the target metal compounds were detected in at least one sample, with the exception of mercury. Of the RCRA toxic metals, none were detected at concentrations significantly higher than in the other two populations. However, the relative standard deviations of the metals were higher for triwalls than for metals containers and half crates, indicating a higher variability in the data. Cadmium, nickel, and silver were detected in one or more TCLP leachate samples above their respective LDR standards. The regulatory impact of these data are discussed in more detail in Section 4. The salt loading in the triwalls is also discussed in detail in Section 4.

The concentration of nitrates in the ASTM leachate was approximately twice that for half crates, which agrees with the reported reduction of nitrates in the salt waste as a result of cessation of plutonium processing in December 1989. The majority of saltcrete half crates were made after this date.

TABLE 3-1

FIELD DATA SUMMARY
SALTCRETE WASTE CHARACTERIZATION SAMPLING
ROCKY FLATS PLANT, COLORADO

SAMPLE	PENETROMETER READINGS TONS/SQ.FT	WET/DRY	VOIDS PRESENT	FREE LIQUID	VISUAL OBSERVATION
SC01408T	2.0, 3.75, 5.0, 2.75, 5.0	Dry	ND	None	White w/orange stripes crumbly
SC02408T	4.5, 4.5, 4.5, 2.5, 4.5	Dry	No	None	Light gray, hard, flaky crumbles, dusty
SC03408T	5.0, 2.5, 2.5, 4.0, 2.0	Dry w/particulates	No	None	Light gray, some particulates rock salt size, breaks into granules easily
SC04408T	All tests >4.5	Dry-damp inside	No	None	Gray, fine granules present w/clay-like properties, crumbly
SC05410T	All test >5.0	Very Dry	No	None	Light gray/white, very dry and hard
SC06410T	All tests >5.0	Very Dry	No	None	Gray/white, hard and flaky
SC07408T	3.5, 2.0, 3.0, 3.0, 2.5	Dry	No	None	Light brown, dry, fine powder leaking
SC08408T	1.5, 0, 1.0, 1.5, 1.5	Dry	No	None	Gray, NH ₃ smell, sticky but crumbles
SC09408T	4.5, 4.5, 4.5, 4.5, 4.5	Dry	No	None	Gray w/white marbling, NH ₃ smell, flaky, not sticky
SC10408T	4.0, 5.0, 5.0, 4.5, 4.5	Dry	No	None	Gray w/white streaks, crumbled into medium to coarse sand
SC11408T	All tests = 5.0	Dry w/damp center	No	None	Gray w/white streaks, breaks into harder clumps
SC12408T	All tests = 5.0	Dry	No	None	White/gray, material can be formed and smeared, clay-like

TABLE 3-1
FIELD DATA SUMMARY
SALTCRETE WASTE CHARACTERIZATION SAMPLING
ROCKY FLATS PLANT, COLORADO
PAGE 2

SAMPLE	PENETROMETER READINGS TONS/SQ.FT	WET/DRY	VOIDS PRESENT	FREE LIQUID	VISUAL OBSERVATION
SC13408T	All tests = 4.5	Dry	No	None	White w/gray specs, slightly damp will clump
SC14408T	All tests = 4.5	Dry	No	None	Off white, dense clay-like, damp
SC15408T	All test = 0	Dry	No	None	Brown, dusty, medium to fine sand
SC16408T	4.0, 3.5, 3.0, 2.0	Dry-dusty	No	None	White/yellowish, very dusty
SC17408T	All tests = 0	Dry	No	None	White/gray sand, very soft silt
SC185XXT	3.5, 1.0, 3.0, 1.5, 1.0	Dry	No	None	Gray, medium sand texture, golf ball size clumps
SC195XXT	All tests = 1.0	Dry-damp center	No	None	White/yellow, fine sand, damp, clay-like
SC205XXT	2.0, 2.0, 2.0, 1.5, 1.75	Dry	No	None	Gray, NH ₃ smell, crumbly, clay-like
SC215XXT	2.5, 2.5, 3.0, 3.0, 4.0	Dry	No	None	Gray, NH ₃ smell, crumbly, textured
SC225XXT	All tests = 0	Dry	No	None	Off-white, flour-like, dry particulates
SC23408T	1.5, 1.5, 1.5, 2.0, 1.75	Dry	No	None	ND
SC24408T	All tests 5.0	Dry	No	None	Gray, hard, porous, homogeneous
SC25408T	All tests 2.5	Dry	No	None	Tan/green w/white particulates, sandy

TABLE 3-1
FIELD DATA SUMMARY
SALTCRETE WASTE CHARACTERIZATION SAMPLING
ROCKY FLATS PLANT, COLORADO
PAGE 3

SAMPLE	PENETROMETER READINGS TONS/SQ.FT	MED/DRY	VOIDS PRESENT	FREE LIQUID	VISUAL OBSERVATION
SC26408T	4.0, 4.5, 4.5, 5.0, 4.5	Dry-damp	No	None	Gray/white, looks like air was present
SC275XXT	All tests = 0	Dry	No	None	White/off-white, expanded block, sand-like
SC285XXT	All tests = 0	Dry top - wet inside	No	None	White sand, very soft mushy clay-like interior
SC29408T	4.5, 3.5, 2.0, 1.0, 2.5	Dry	No	None	White particles, light gray crumbling, gravel-like
SC30408T	All tests - 5.0	Dry	No	None	Hard, cement-like
SC31XXXT	4.5, 4.5, 4.0, 2.5, 2.0	Dry	No	None	Light gray, solid, crumbly
SC325XXT	1.0, 0.5, 1.25, 0.75, 0	Very dry	No	None	Tan, solid, crumbly, flaky, poor condition
SC33XXXT	4.5, 4.5, 4.5, 4.0, 4.0	Dry	No	None	Light gray, chunks could be hand broken
SC34XXXT	4.5, 2.75, 3.0, 2.0, 3.0	Some moisture	No	None	Gray, clay-like, crumbly
SC355XXT	3.5, 3.0, 3.0, 3.0, 3.0	Some moisture	No	None	Gray, clay-like, some moisture
SC36408T	All tests = 5.0	Dry	No	None	Gray w/white swirls, interior damp
SC37408T	3.5, 2.0, 1.0, 1.5, 2.0	Damp	No	None	Sandy gray, damp surface, particulates present

TABLE 3-1
FIELD DATA SUMMARY
SALTCRETE WASTE CHARACTERIZATION SAMPLING
ROCKY FLATS PLANT, COLORADO
PAGE 4

SAMPLE	PENETROMETER READINGS TONS/SQ.FT	WET/DRY	VOIDS PRESENT	FREE LIQUID	VISUAL OBSERVATION
SC38408T	All tests = 5.0	Dry	No	None	White/gray w/particulates, very hard, textured surface
SC39408T	All tests = 3.0	Damp, clay-like	No	None	Gray/green, light colored particulates, clay-like interior
SC40408T	All tests = 5.0	Dry	No	None	Gray, very solid
SC41408M	4.0, >4.5, >4.5, >4.5, >4.5	Dry	No	None	Very hard, texture-cracking, very little moisture
SC424XXT	3.0, 3.0, 2.0, 3.5, 3.5	Slightly damp	No	None	Medium gray, surface slightly brittle
SC435XXT	All tests = 0	Dry	No	None	Light brown w/rust spots, gray and sandy through
SC445XXT	All tests = 0	Dry	No	None	Light gray/white, sandy and soft through
SC455XXH	All tests >4.5	Very dry	No	None	Grayish, very crumbly
SC465XXH	All tests >4.5	Dry	No	None	Grayish, dry and crumbly, breaks into chunks
SC475XXH	All tests = 5.0	Dry	No	None	Gray even color, very hard, breaks into gravel
SC485XXH	All tests = 5.0	Dry	No	None	White surface, gray interior, hard interior, soft shell
SC495XXH	All tests = 5.0	Dry	No	None	Light gray, solid clay

TABLE 3-1
FIELD DATA SUMMARY
SALTCRETE WASTE CHARACTERIZATION SAMPLING
ROCKY FLATS PLANT, COLORADO
PAGE 5

SAMPLE	PENETROMETER READINGS TONS/SQ.FT	WET/DRY	VOIDS PRESENT	FREE LIQUID	VISUAL OBSERVATION
SC505XXH	All tests = 5.0	Dry	No	None	Gray, clay-like, will crumble
SC515XXH	All tests >4.5	Dry	No	None	Gray, very hard, breaks into chips
SC525XXH	All tests >4.5	Dry	No	None	Gray, crumbly but hard
SC535XXH	All tests >4.5	Dry	No	None	Gray, crumbly
SC545XXH	All tests >4.5	Dry	No	None	Gray, very sandy, fine
SC555XXH	All tests = 5.0	Dry	No	None	White surface, gray interior, chips, porous
SC565XXH	All tests = 5.0	Dry	No	None	Very white surface, gray center
SC57408M	All tests = 0	Dry	5" deep gaps	None	White dusty with sandy texture
SC58408M	2.5, 2, 5, 5, 4.0	Dry	No	None	Yellow surface, off-white granules in interior
SC595XXM	ND	Dry	No	None	Gray, sandy, very soft, gray/white interior
SC605XXM	0.25, 0.25, 1.0, 1.0, 1.5	Moist	No	None	Gray/white, texture flour-like, moist

ND = Not Done

TABLE 3-2

SUMMARY OF SALTCRETE CHARACTERIZATION DATA - TRIWALL
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION ⁽¹⁾	STANDARD DEVIATION ⁽¹⁾	% RELATIVE STANDARD DEVIATION ⁽¹⁾
VOLATILES⁽²⁾						
Methylene Chloride	ug/kg	6/45	4 to 12	4	2	46
Acetone	ug/kg	6/45	130 to 260	50	50	100
2-Butanone	ug/kg	10/45	4 to 47	8	7	84
1,1,1-Trichloroethane	ug/kg	2/45	6 to 17	4	2	59
Benzene	ug/kg	6/45	5 to 28	4	4	99
4-Methyl-2-pentanone	ug/kg	2/45	13 to 22	7	3	36
Tetrachloroethene	ug/kg	2/45	5 to 12	3	1	39
Toluene	ug/kg	11/45	4 to 41	7	.8	130
SEMI-VOLATILES⁽²⁾	ug/kg	0/45	ND	ND	ND	ND
ALCOHOLS⁽²⁾	mg/kg	0/45	ND	ND	ND	ND
INORGANICS						
Aluminum	mg/kg	45/45	3440 to 41500	10410	9000	90
Arsenic	mg/kg	14/45	9.0 to 84.6	16	17	107
Barium	mg/kg	45/45	46.6 to 868	187	153	82
Boron	mg/kg	45/45	56.6 to 7620	965	1470	152
Cadmium	mg/kg	38/45	1.2 to 17.7	4.3	4.2	99
Calcium	mg/kg	45/45	70600 to 915000	186000	166000	89
Chromium	mg/kg	45/45	10.3 to 190	41.9	33.7	80.3
Iron	mg/kg	45/45	2380 to 41300	8480	7260	86
Lead	mg/kg	9/45	2.9 to 41.6	4.6	6.8	150
Magnesium	mg/kg	45/45	939 to 16300	3270	3030	93
Mercury	mg/kg	0/45	ND	ND	ND	ND
Nickel	mg/kg	45/45	8.3 to 529	58.2	83.7	144
Potassium	mg/kg	45/45	48600 to 539000	196000	143000	70
Selenium	mg/kg	0/45	ND	ND	ND	ND
Silver	mg/kg	42/45	4.5 to 168	44.8	42.5	94.9
Sodium	mg/kg	45/45	98300 to 668000	290000	206000	70

TABLE 3-2
SUMMARY OF SALTCRETE CHARACTERIZATION DATA - TRIWALL
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO
PAGE 2

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION ⁽¹⁾	STANDARD DEVIATION ⁽¹⁾	% RELATIVE STANDARD DEVIATION ⁽¹⁾
TCLP LEACH						
Aluminum	ug/l	20/42	90.0 to 36300	1170	5570	480
Arsenic	ug/l	29/42	114 to 257	152	66.8	43.9
Barium	ug/l	42/42	256 to 1860	942	360	38
Cadmium	ug/l	20/42	5.0 to 100	17.6	24.9	140
Calcium	ug/l	42/42	207000 to 349000	195000	680000	35
Chromium	ug/l	40/42	17 to 391	132	94.1	71.5
Iron	ug/l	10/42	73.0 to 2550	109	396	363
Lead	ug/l	4/42	22.0 to 34.0	15.3	10.8	70.4
Magnesium	ug/l	36/42	160 to 62700	12700	13300	100
Mercury	ug/l	0/42	ND	ND	ND	ND
Nickel	ug/l	40/42	30.0 to 975	219	195	89
Selenium	ug/l	2/42	80.0 to 95.0	48.0	27.4	57.1
Silver	ug/l	20/42	3.0 to 144	20.5	36.1	176
ASTM LEACHATE						
Chloride	mg/l	42/42	310 to 6200	850	900	110
Nitrate	mg/l	42/42	1900 to 4100	2900	470	16
Phosphorus	mg/l	5/42	0.01 to 0.6	0.03	0.1	360
Sulfate	mg/l	42/42	650 to 4500	2200	860	40
MISCELLANEOUS						
Moisture-gravimetric	%	45/45	15.6 to 31.3	23.2	3.7	15.8
Ammonia	mg/kg	20/45	10 to 51	14	13	94
Cyanide-amenable	mg/kg	45/45	-98 to 7.9	-10	24	230
Cyanide-total	mg/kg	44/45	3.2 to 15	8.2	3.2	39
Gross alpha	pCi/g	45/45	35+-7 to 750+-80	184	150	80
Gross beta	pCi/g	45/45	120+-20 to 470+-50	200	72	36
TOC	mg/kg	45/45	270 to 12000	3900	1760	45

ND Not Detected
pCi/g Picocuries per gram

(1) Values calculated using 1/2 detection limit for nondetects, based on guidance contained in the Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A). Interim Final, December 1989.

(2) Only compounds with positive detections are listed. The complete list of compounds analyzed is shown in Table 2-5. The complete database is included in Appendix B.

The moisture content of the triwalls ranged from 15.6% to 31.3%, with an average of approximately 23%. The TOC averaged approximately 3900 mg/kg, which indicates a significant organic content in the waste.

3.3 HALF CRATE ANALYTICAL DATA

Twelve half crates plus one duplicate were sampled and analyzed as part of the waste characterization program. The half crate analytical data are summarized in Table 3-3.

Only three volatile organics were detected in any of the samples, significantly less than the detections recorded for the triwall samples. None were detected at concentrations of regulatory concern. The concentrations are well below levels necessary to result in TCLP leachate values exceeding LDR standards, even assuming 100% leachability.

None of the target semi-volatile organics and alcohols were detected in any of the samples.

All of the target metal compounds were detected in at least one sample, with the exception of arsenic, cadmium, iron, lead, selenium, and silver. None of the RCRA constituents were above their respective LDR standards. The relative standard deviations of the metals were similar to those for metal containers and less than those for triwalls. This suggests that the concentrations of metals are less variable in the half crates compared to the triwalls.

The concentration of nitrate in the ASTM leachate ranged from 900 to 2500 mg/l which is approximately half of the concentration found in the ASTM leachate for triwalls. This observation agrees with the reported reduction of nitrates in the salt waste as a result of cessation of plutonium processing in December 1989.

The moisture content of the half crates ranged from 18.8% to 25.6%, with an average of approximately 22.3%. The TOC averaged approximately 3504.6 mg/kg, which indicates a significant organic content in the waste. The gross alpha and gross beta concentrations for the half crates were higher than the concentrations for the triwalls and the metal containers.

The half crates had higher total and amenable cyanide concentrations than the triwalls and metal containers. The total cyanide concentration and the amenable cyanide concentration ranged from -35 to 56 mg/kg and 16 to 81 mg/kg, respectively. The amenable cyanide LDR standard of 30 mg/kg was exceeded in two

TABLE 3-3

SUMMARY OF SALTCRETE CHARACTERIZATION DATA - HALFCRATE
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION ⁽¹⁾	STANDARD DEVIATION ⁽¹⁾	% RELATIVE STANDARD DEVIATION ⁽¹⁾
VOLATILES ⁽²⁾						
2-Butanone	ug/kg	9/13	4 to 45	16	14	88
Toluene	ug/kg	3/13	4 to 8	4	1	37
Freon 113	ug/kg	1/13	14	4	3	75
SEMI-VOLATILES ⁽²⁾	ug/kg	0/13	ND	ND	ND	ND
ALCOHOLS ⁽²⁾	mg/kg	0/13	ND	ND	ND	ND
INORGANICS						
Aluminum	mg/kg	13/13	6330 to 11900	8790	2240	25
Arsenic	mg/kg	1/13	9.9	4.3	1.7	39
Barium	mg/kg	13/13	134 to 276	190	59	31
Boron	mg/kg	13/13	87.1 to 164	121	25	20
Cadmium	mg/kg	13/13	1.5 to 5.5	3.7	0.9	25
Calcium	mg/kg	13/13	126000 to 282000	198000	57700	29
Chromium	mg/kg	13/13	30.2 to 118	51.7	24.9	48.1
Iron	mg/kg	13/13	6830 to 12500	8910	2160	24
Lead	mg/kg	0/13	ND	ND	ND	ND
Magnesium	mg/kg	13/13	1760 to 8490	3880	2480	64
Mercury	mg/kg	11/13	0.1	0.1	0.02	20
Nickel	mg/kg	13/13	22.4 to 45.8	30.7	7.5	24.3
Potassium	mg/kg	13/13	38900 to 164000	105000	44600	43
Selenium	mg/kg	0/13	ND	ND	ND	ND
Silver	mg/kg	13/13	16.0 to 57.8	32.6	12.6	38.5
Sodium	mg/kg	13/13	62300 to 133000	94300	26600	28
TCLP LEACH						
Aluminum	ug/l	10/12	95 to 1090	4100	390	97
Arsenic	ug/l	0/11	ND	ND	ND	ND
Barium	ug/l	12/12	840 to 1500	1180	230	19
Cadmium	ug/l	0/12	ND	ND	ND	ND
Calcium	ug/l	12/12	633000 to 3120000	1800000	940000	52
Chromium	ug/l	12/12	147 to 978	457	302	66
Iron	ug/l	0/12	ND	ND	ND	ND
Lead	ug/l	0/12	ND	ND	ND	ND
Magnesium	ug/l	1/12	191	64	44	68
Mercury	ug/l	2/12	1.0	0.2	0.4	180
Nickel	ug/l	12/12	31.0 to 199	84.9	45.3	53.3
Selenium	ug/l	0/12	ND	ND	ND	ND
Silver	ug/l	0/1	ND	ND	ND	ND

TABLE 3-3
SUMMARY OF SALTCRETE CHARACTERIZATION DATA - HALFCRATE
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION ⁽¹⁾	STANDARD DEVIATION ⁽¹⁾	% RELATIVE STANDARD DEVIATION ⁽¹⁾
ASTM LEACHATE						
Chloride	mg/L	12/12	690 to 2600	1360	600	44
Nitrate	mg/L	12/12	900 to 2500	1360	560	41
Phosphorus	mg/L	0/12	ND	ND	ND	ND
Sulfate	mg/L	12/12	1100 to 4100	2150	980	46
MISCELLANEOUS						
Moisture-gravimetric	%	13/13	18.8 to 25.6	22.3	2.4	11.0
Ammonia	mg/kg	5/13	<10 to 22	10	6.4	63
Cyanide-amenable	mg/kg	13/13	-35 to 56	-0.054	31	57100
Cyanide-total	mg/kg	13/13	16 to 81	38	23	62
Gross alpha	pCi/g	12/13	<9 to 140+20	60	40	61
Gross beta	pCi/g	13/13	49+-6 to 150+-20	110	33	31
TOC	mg/kg	13/13	560 to 5000	3500	1500	43

ND Not Detected
pCi/g Picocuries per gram

(1) Values calculated using 1/2 detection limit for nondetects, based on guidance contained in the Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A). Interim Final, December 1989.

(2) Only compounds with positive detections are listed. The complete list of compounds analyzed is shown in Table 2-5. The complete database is included in Appendix B.

samples. The implication of this data is discussed in Section 4.0.

3.4 METAL CONTAINER ANALYTICAL DATA

A total of 6 triwalls from within the metal containers plus one duplicate was analyzed for characterization of this population. The analytical data are summarized in Table 3-4.

Three individual volatile organic analytes were detected in one or more samples. The compounds detected were 2-butanone, toluene, and total xylenes. None of the volatile organics were present at concentrations that could exceed their respective LDR standards in the TCLP ZHE leachate, conservatively assuming that all of the volatile compound would leach.

No target semi-volatile organics or alcohols were detected in any of the samples.

All of the target metal compounds were detected in at least one sample. Of the RCRA toxic metals, cadmium, nickel and silver were detected at concentrations above their respective LDR standards. The regulatory impact of these data are discussed in more detail in Section 4.0.

The concentration of nitrates in the ASTM leachate was similar to the concentration in the triwalls but greater than the concentration in the half crates.

The concentration of aluminum, iron, and calcium were low when compared to the concentrations in the triwalls and the half crates. This indicates that the triwalls in the metal containers have less cement than the triwalls and the half crates which may indicate why there were defects in the billet and why the billets are stored in a metal container.

The average TOC of the metal containers was approximately 5975 mg/kg which indicates significant organic content in the waste. The metal container had the highest concentration of TOC compared to half crates and triwalls.

3.5 COMPOSITE ANALYTICAL DATA

Three composite samples were prepared from the individual samples collected for triwalls, half crates, and metal containers. The analytical data are summarized in Table 3-5 and a discussion of the data is provided below.

TABLE 3-4

SUMMARY OF SALTCRETE CHARACTERIZATION DATA - METAL
SOLAR POND/PONDCRETE PROJECT
ROCK FLATS PLANT, COLORADO

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION ⁽¹⁾	STANDARD DEVIATION ⁽¹⁾	% RELATIVE STANDARD DEVIATION ⁽¹⁾
VOLATILES ⁽²⁾						
2-Butanone	ug/kg	3/7	5	6	0.8	14
Toluene	ug/kg	2/7	7	4	2	44
Xylenes (total)	ug/kg	2/7	4	3	0.5	13
SEMI-VOLATILES ⁽²⁾	ug/kg	ND	ND	ND	ND	ND
ALCOHOLS ⁽²⁾	mg/kg	ND	ND	ND	ND	ND
INORGANICS						
Aluminum	mg/kg	7/7	3220 to 8110	5450	2030	40
Arsenic	mg/kg	1/7	8.2	5.0	1.7	34
Barium	mg/kg	7/7	70.3 to 114	87.2	16.0	18.3
Boron	mg/kg	7/7	148 to 1910	748	805	108
Cadmium	mg/kg	5/7	2.4 to 5.0	2.9	2.1	71
Calcium	mg/kg	7/7	74300 to 130000	97400	22200	20
Chromium	mg/kg	7/7	14.2 to 25	20	3.8	19
Iron	mg/kg	7/7	3550 to 5260	4230	650	15
Lead	mg/kg	0/7	ND	ND	ND	ND
Magnesium	mg/kg	7/7	1590 to 2260	2010	220	10
Mercury	mg/kg	5/7	0.1 to 0.2	0.1	0.05	50
Nickel	mg/kg	7/7	14.0 to 80.0	40	32	75
Potassium	mg/kg	7/7	52100 to 152000	108000	43000	40
Selenium	mg/kg	0/7	ND	ND	ND	ND
Silver	mg/kg	7/7	2.7 to 68.8	35.2	31.6	89.8
Sodium	mg/kg	7/7	118000 to 207000	153000	34000	20
TCLP LEACH						
Aluminum	ug/l	6/6	90.0 to 2870	970	1060	110
Arsenic	ug/l	1/6	166	89.8	39.0	43.4
Barium	ug/l	6/6	554 to 1030	829	164	20
Cadmium	ug/l	3/6	5.0 to 141	41	61	148
Calcium	ug/l	6/6	30400 to 3290000	1680000	1150000	70
Chromium	ug/l	6/6	42.0 to 146	85.0	36.7	43.1
Iron	ug/l	3/6	40 to 982	235	383	163
Lead	ug/l	1/6	20.0	13.1	4.0	30.4
Magnesium	ug/l	5/6	171 to 62100	19500	29700	150
Mercury	ug/l	1/6	0.1	0.06	0.02	35
Nickel	ug/l	5/6	35 to 2330	714	1060	148
Selenium	ug/l	1/6	80.0	46.7	16.3	35.0
Silver	ug/l	2/2	105 to 156	131	36	28

TABLE 3-4
SUMMARY OF SALTCRETE CHARACTERIZATION DATA - METAL
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION ⁽¹⁾	STANDARD DEVIATION ⁽¹⁾	% RELATIVE STANDARD DEVIATION ⁽¹⁾
ASTM LEACHATE						
Chloride	mg/l	6/6	340 to 2000	890	750	90
Nitrate	mg/l	6/6	1900 to 3000	2600	480	20
Phosphorus	mg/l	0/6	ND	ND	ND	ND
Sulfate	mg/l	6/6	800 to 7200	2700	2400	90
MISCELLANEOUS						
Moisture-gravimetric	%	7/7	18.9 to 27.9	21.9	3.5	16
Ammonia	mg/kg	4/7	<9.9 to 180	34.3	64.7	189
Cyanide-amenable	mg/kg	7/7	-72 to 13	-21	29	170
Cyanide-total	mg/kg	7/7	9.0 to 34	18	8.9	49
Gross alpha	pCi/g	7/7	18.0+8 to 450+-50	180	160	90
Gross beta	pCi/g	7/7	96.0+-10 to 220+-30	170	46	27
TOC	mg/kg	7/7	2300 to 9100	6000	2490	40

ND Not Detected

pCi/g Picocuries per gram

- (1) Values calculated using 1/2 detection limit for nondetects, based on guidance contained in the Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A). Interim Final, December 1989.
- (2) Only compounds with positive detections are listed. The complete list of compounds analyzed is shown in Table 2-5. The complete database is included in Appendix B.

TABLE 3-5
SUMMARY OF SALTRETE CHARACTERIZATION DATA - COMPOSITES
SOLAR POND/PONCRETE PROJECT
ROCKY FLATS PLANT, COLORADO

ANALYSIS	UNITS	HALFCRATES COMPOSITE	METALS COMPOSITE	TRIWALLS COMPOSITE
VOLATILES ⁽¹⁾				
Acetone	ug/kg	11	20	15
SEMI-VOLATILES ⁽¹⁾	ug/kg	ND	ND	ND
ALCOHOLS ⁽¹⁾	mg/kg	ND	ND	ND
INORGANICS				
Aluminum	mg/kg	7790	4770	5250
Arsenic	mg/kg	ND	13.8	16.7
Barium	mg/kg	168	80.1	101
Cadmium	mg/kg	3.7	2.6	2.1
Boron	mg/kg	111	667	412
Calcium	mg/kg	173,000	86,200	98,000
Chromium	mg/kg	47.1	17.1	22.1
Iron	mg/kg	7780	3770	4750
Lead	mg/kg	4.6	ND	ND
Magnesium	mg/kg	3130	1840	1630
Mercury	mg/kg	ND	ND	ND
Nickel	mg/kg	23.6	41.4	29.8
Potassium	mg/kg	113,000	114,000	92,100
Selenium	mg/kg	ND	ND	ND
Silver	mg/kg	34.5	38.3	24.9
Sodium	mg/kg	91,100	134,000	147,000
TCLP LEACH				
Aluminum	ug/l	171	1340	1210
Arsenic	ug/l	212	323	290
Barium	ug/l	957	585	597
Cadmium	ug/l	ND	ND	ND
Calcium	ug/l	818,000	625,000	509,000
Chromium	ug/l	517	71.0	143
Iron	ug/l	65.0	142	144
Lead	ug/l	ND	ND	ND
Magnesium	ug/l	46.0	47.0	54.0
Mercury	ug/l	ND	ND	ND
Nickel	ug/l	94.0	141	42.0
Selenium	ug/l	ND	ND	ND
Silver	ug/l	ND	ND	ND
ASTM LEACHATE				
Chloride	mg/l	1800	4400	14,000
Nitrate	mg/l	1500	2700	3000
Phosphorus	mg/l	ND	ND	ND
Sulfate	mg/l	2600	2300	2200
MISCELLANEOUS				
Moisture-gravimetric	%	18.2	18.1	20.4
Ammonia	mg/kg	ND	ND	ND
Cyanide-amenable	mg/kg	-79	24	18
Cyanide-total	mg/kg	73	36	20
Gross alpha	pCi/g	210+-30	430+-50	310+-40
Gross beta	pCi/g	140+-20	200+-20	220+-30
TOC	mg/kg	3500	4100	3400

ND Not Detected

pCi/g Picocuries per gram

(1) Only compounds with positive detections are listed. The complete list of compounds analyzed is shown in Table 2-3. The complete database is included in Appendix b.

Triwall Composite Sample

Only one volatile organic analyte was detected. The compound detected was acetone which was detected at the highest concentrations in the triwall samples. The other volatile organic samples which were detected in the triwalls were likely volatilized during the processing of the bulk sample for the treatability study. Acetone was not at a concentrations that could exceed its LDR standards in the TCLP ZHE leachate, conservatively assuming that all of the volatile compound would leach.

No target semi-volatile organics or alcohols were detected in any of the samples.

All of the target metal compounds were detected in the TCLP leachate except for mercury, lead, and cadmium. Surprisingly, cadmium is undetected in the composite when it was detected above the RCRA LDR standard in several of the triwall samples. None of the heavy metals were above their RCRA standard in the composite sample. The composite sample concentrations of heavy metals in the TCLP leachate are similar or lower in concentration than the mean concentration for the triwalls.

The moisture content of the composite sample is 20.4 percent which is within the range of the triwall's moisture content (15.6 to 31.3 percent).

Half Crate Composite Sample

Acetone was the only organic compound detected. Acetone was detected at 11 ug/kg although it was not detected in the half crate samples. The concentration is well below the level necessary to result in TCLP leachate values exceeding the LDR standard, even assuming 100 percent leachability.

None of the target semi-volatile organics and alcohols were detected in any of the samples.

All of the target metal compounds were detected with the exception of cadmium, mercury, lead, selenium, and silver. None of the RCRA constituents were above their respective LDR standards. The composite contaminant concentrations were at similar concentrations to the mean concentration of the half crates.

The moisture content of the composite sample is 18.2 compared to the range of 18.8 to 25.6 percent for the half crate samples.

Metal Composite Sample

Acetone was the only volatile organic compound detected. Acetone was detected at 20 ug/kg although it was not detected in the samples for the metal containers. Acetone is not present at a concentration that could exceed its LDR standard in the TCLP ZHE leachate, conservatively assuming that all of the volatile compound would leach.

No target semi-volatile organics or alcohols were detected in any of the samples.

All of the target metal compounds were detected with the exception of silver, selenium, mercury, lead, and cadmium. None of the RCRA toxic metals were detected at concentrations above their respective LDR standards. The concentration of metals are lower in the composite sample compared to the mean concentration of the samples from the metal containers.

The moisture content of the composite sample is 18.1 percent compared to a range of 18.9 to 27.9 percent for the samples in the metal containers.

4.0 SUMMARY AND CONCLUSIONS

4.1 REGULATORY COMPLIANCE

The overall goal of the solar pond/pondcrete project is to produce a stabilized waste form that meets all regulatory requirements for ultimate land disposal. It is anticipated that the stabilized waste will be disposed at the Nevada Test Site (NTS). Since saltcrete is a mixed waste, Federal and state regulations that apply to the disposal of hazardous waste are applicable. Additional requirements are listed in the "Nevada Test Site Defense Waste Acceptance Criteria, Certification, and Transfer Requirements," NVO-325.

The Land Disposal Restrictions (LDRs), 40 CFR Part 268, apply to all hazardous wastes. The LDR regulations specify treatment standards that must be met prior to land disposal of hazardous waste. Treatment standards can be expressed as a concentration limit in an extract of the waste (CCWE), a concentration limit in the waste (CCW), or as a specified technology. The hazardous waste codes associated with saltcrete are as follows: F001, F002, F003, F005, F006, F007, and F009. Separate LDR standards have been promulgated for wastewaters and non-wastewaters. Saltcrete is classified as a non-wastewater. The LDR treatment standards for non-wastewaters are listed in Table 4-1.

The saltcrete samples were subjected to the Toxicity Characterization Leaching Procedure (TCLP) and the extract analyzed for heavy metals. This data can be compared to standards to determine whether the material is a RCRA hazardous waste based on the characteristic of toxicity. The regulatory standards for metal constituents for the toxicity characteristic are as follows:

• Arsenic	5.0 mg/l
• Barium	100.0 mg/l
• Cadmium	1.0 mg/l
• Chromium	5.0 mg/l
• Lead	5.0 mg/l
• Mercury	0.2 mg/l
• Selenium	1.0 mg/l
• Silver	5.0 mg/l

The saltcrete samples were not subjected to the Zero Headspace Extraction and analyzed for volatile organics. Previous data (Rockwell International 1989) and characterization data summarized in Section 3.0 show that volatile organics are not present in the waste at concentrations sufficient to leach above their

TABLE 4-1

**LDR TREATMENT STANDARDS - SALTCRETE
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO**

REGULATED HAZARDOUS CONSTITUENT	LDR TREATMENT STANDARD (NONWASTEWATERS)⁽¹⁾	
	F001-F003, F005	F006, F007, F009
Acetone	0.59 mg/l ⁽²⁾	NA
n-Butyl Alcohol	5.0 mg/l ⁽²⁾	NA
Carbon Disulfide	4.81 mg/l ⁽²⁾	NA
Carbon Tetrachloride	0.96 mg/l ⁽²⁾	NA
Chlorobenzene	0.05 mg/l ⁽²⁾	NA
Cyclohexanone	0.75 mg/l ⁽²⁾	NA
1,2-Dichlorobenzene	0.125 mg/l ⁽²⁾	NA
Ethyl Acetate	0.75 mg/l ⁽²⁾	NA
Ethylbenzene	0.053 mg/l ⁽²⁾	NA
Ethyl Ether	0.75 mg/l ⁽²⁾	NA
Isobutanol	5.0 mg/l ⁽²⁾	NA
Methanol	0.75 mg/l ⁽²⁾	NA
Methylene Chloride	0.96 mg/l ⁽²⁾	NA
2-Butanone (MEK)	0.75 mg/l ⁽²⁾	NA
4-Methyl-2-pentanone (MIBK)	0.33 mg/l ⁽²⁾	NA
Pyridine	0.33 mg/l ⁽²⁾	NA
Tetrachloroethylene (PCE)	0.05 mg/l ⁽²⁾	NA
Toluene	0.33 mg/l ⁽²⁾	NA
1,1,1-Trichloroethane	0.41 mg/l ⁽²⁾	NA
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	0.96 mg/l ⁽²⁾	NA
Trichloroethylene (TCE)	0.091 mg/l ⁽²⁾	NA
Trichlorofluoromethane	0.96 mg/l ⁽²⁾	NA
Xylene	0.15 mg/l ⁽²⁾	NA
1,1,2-Trichloroethane	7.6 mg/kg ⁽³⁾	NA
Benzene	3.7 mg/kg ⁽³⁾	NA
2-Nitropropane	Incineration ⁽⁴⁾	NA
2-Ethoxyethanol	Incineration ⁽⁴⁾	NA
Cyanides (Total)	NA	590 mg/kg ⁽³⁾
Cyanides (Amenable)	NA	30 mg/kg ⁽³⁾
Cadmium	NA	0.066 mg/l ⁽²⁾
Chromium (Total)	NA	5.2 mg/l ⁽²⁾
Lead	NA	0.51 mg/l ⁽²⁾
Nickel	NA	0.32 mg/l ⁽²⁾
Silver	NA	0.072 mg/l ⁽²⁾

TABLE 4-1
LDR TREATMENT STANDARDS - SALTCRETE
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS FACILITY
PAGE 2 OF 2

(1) Wastewaters are defined by 40 CFR 268.2(f) as wastes that contain less than 1% TOC and 1% TSS by weight. Also, for F001-F005 solvent mixtures, wastewaters must contain less than 1% TOC or 1% total F001-F005 solvents, by weight.

(2) Concentration in waste extract (CCWE)

(3) Concentration in waste (CCW)

(4) Specified treatment technology

LDR - Land Disposal Restrictions, 40 CFR Part 268

NA - Not applicable

above their respective toxicity characteristic (TC) and Land Disposal Restriction (LDR) standards. Similarly, previous data indicate that TC semi-volatiles are not present in the waste at concentrations sufficient to leach above their respective TC standards. Therefore, saltcrete TCLP extracts were not analyzed for the TC semi-volatile organics. Based on process knowledge that pesticides and herbicides were not manufactured at Rocky Flats, TCLP extracts were also not analyzed for TC pesticides and herbicides.

Half Crates

The half crate TCLP metals data were compared to the LDR standards for non-wastewaters (See Table 4-1), and those constituents exceeding their respective standards are listed in Table 4-2. As shown, none of the half crate samples exceeded LDR stands for metals (TCLP metals concentration vs. CCWE LDR standard). However, 2 of 13 half crate samples tested contained amenable cyanide at concentrations exceeding the LDR standard (CCW). It must be noted that the amenable cyanide mean concentration is well below the LDR standard (30 mg/kg). Also, when the data are analyzed using the approach outlined in Chapter 9 of SW-846, the upper limit of the 80% confidence interval (CI) is below the LDR standard (see calculation in Appendix F). Therefore, it is possible to predict with reasonable certainty that the half crate population as a whole is below the LDR standard for amenable cyanide.

Metal Containers

The TCLP metals data for saltcrete from metal containers were compared to LDR standards for non-wastewaters (See Table 4-1), and those constituents exceeding their respective standards are listed in Table 4-2. As shown, two of six saltcrete samples from metal containers exceeded LDR standards for cadmium, nickel, and silver. The saltcrete samples exceeding the cadmium, nickel, and silver standards were the same in this case, SC-01408-M and SC-41408-M. Table 4-3 lists the actual values of the samples above LDR standards.

The mean concentrations of nickel and silver exceed their respective LDR standards. Thus, based on the number of samples collected, the population of metal containers can be considered to exceed LDR standards for these parameters. Additional samples would be required to gather sufficient data to prove otherwise (see calculations in Appendix F). The mean concentration of cadmium is below its LDR standard. However, using the procedure outlined in Chapter 9 of SW-846, the upper limit of the 80% confidence interval is greater than the LDR standard. Therefore, unless additional samples are collected and prove otherwise, the

TABLE 4-2

SALTCRETE SAMPLES EXCEEDING LDR STANDARDS
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS, COLORADO

Saltcrete Population	Analyte	LDR Standard	Frequency	Mean Concentration	Upper Limit of 80% Confidence Interval ⁽¹⁾	Contaminant Present at Level Exceeding LDR Standard? ⁽²⁾
Half Crates	Cyanide-Amenable	30 mg/kg (CCW)	2/13	12.9 ⁽²⁾	20.2 ⁽²⁾	No
Metals	Cadmium - TCLP	66 ug/l (CCWE)	2/6	40.9	77.4	Yes
	Nickel - TCLP	320 ug/l (CCWE)	2/6	713.8	(3)	Yes
	Silver - TCLP	72 ug/l (CCWE)	2/2	130.5	(3)	Yes
Triwalls	Cadmium - TCLP	66 ug/l (CCWE)	3/42	16.9	21.9	No
	Nickel - TCLP	320 ug/l (CCWE)	7/42	208.7	248	No
	Silver - TCLP	72 ug/l (CCWE)	5/42	19.6	26.7	No

CCW - Contaminant Concentration in Waste.

CCWE - Contaminant Concentration in Waste Extract.

(1) Following procedure outlined in Chapter 9 of SW-846.

(2) Negative values assumed to be zero.

(3) Mean is already greater than LDR standard.

TABLE 4-3
METAL CONTAINER SAMPLES EXCEEDING LDR STANDARDS
SALTCRETE WASTE CHARACTERIZATION
ROCKY FLATS, COLORADO

Sample	Cadmium (ug/l)	Nickel (ug/l)	Silver (ug/l)
SC-01408-M	92	1800	105
SC-41408-M	141	2330	156
LDR Standard	66	320	72

population of metal containers can be considered to exceed the LDR standard for cadmium.

None of the samples exceeded LDR CCW standards or toxicity characteristic standards based on TCLP metals data.

Triwalls

The TCLP metals data for saltcrete from triwalls were compared to LDR standards for non-wastewaters (see Table 4-1), and those constituents exceeding their respective standards are listed in Table 4-2. As shown, saltcrete samples exceeded LDR standards for cadmium, nickel, and silver. Eight of the 42 triwall samples exceeded at least one LDR standard, as shown in Table 4-4. The methodology outlined in Chapter 9 of SW-846 was used to determine the adequacy of the sampling effort. The upper limits of the 80% Confidence Interval (CI) of the TCLP data were calculated and compared to the LDR standards for the three metals. In each case, the upper limit of the CI was below the LDR standard, therefore, it is possible to state that the triwall population as a whole does not exceed LDR standards. The mean concentrations and the calculated CI upper limits are shown on Table 4-2.

None of the triwall samples exceeded toxicity characteristic standards for RCRA toxic metals.

4.2 EVALUATION OF SALTCRETE POPULATIONS

Both the composition of the salts waste entering the saltcrete process and the salt loadings have reportedly changed over time. Variations within and between the three saltcrete populations are important considerations in the development of a saltcrete processing system. The important changes in saltcrete production are as follows:

- April 1989 - Triwall production ended, and half crate production began.
- December 1990 - Plutonium production ceases, resulting in a reduction in the nitrate concentration in the salt waste.
- June 1990 - Waste loading reduced from 50-55% to 33%.

TABLE 4-4
TRIWALL SAMPLES EXCEEDING LDR STANDARDS
SALTCRETE WASTE CHARACTERIZATION
ROCKY FLATS PLANT, COLORADO

Sample	Cadmium (ug/l)	Nickel (ug/l)	Silver (ug/l)
SC-15408-T	100	975	144
SC-16408-T	-	589	-
SC-23408-T	-	734	83
SC-285XX-T	91	389	129
SC-29408-T	-	507	-
SC-31XXX-T	-	367	-
SC-355XX-T	93	-	101
SC-39408-T	-	387	73
LDR Standard	66	320	72

- Value less than LDR Standard. Only values greater than standard are reported.

To help confirm the process changes and interpret the waste loading data, waste loading histograms for each of the saltcrete populations over time were prepared. Figures 4-1, 4-2, and 4-3 present the data for the triwalls, half crates, and the metal containers, respectively. The figures graphically present the potassium and sodium concentrations for each saltcrete sample analyzed. These parameters were chosen as being the most representative of the salt waste. It was not useful to graph the anion concentrations, such as nitrate, since the anions were analyzed on ASTM leachates, and were expressed as aqueous concentrations.

Figure 4-1 shows the potassium and sodium data for triwalls. It clearly shows the wide variations in waste loading that actually occurred, even though the salt loading during this (1986-1989) was nominally 55%. Samples 18 through 31 seem to indicate a stable period of production, but these samples were actually produced over a six week period.

Figure 4-2 shows the potassium and sodium data for half crates. This graph shows a drop in the waste loading between the April 1990 and the December 1990 samples, which agrees with the reported June 1990 drop in waste loading from 50-55% to 33%.

Figure 4-3 shows the potassium and sodium data for metal containers. The salt loading of the six samples, as measured by the sum of potassium and sodium concentrations, was fairly constant, approximately 250,000 mg/kg total. Since the samples from the metal containers are a subset of the triwall population, the data from the two populations can be compared. The salt loadings of the metal containers samples are at the lower end of the triwall salt loadings, when the data on Figure 4-3 are compared with the data on Figure 4-1.

The analytical data summarized in Section 3.0 can also be examined to assess variations in salt loading over time. When the mean concentrations of potassium and sodium are compared, the data show that the salt loading of the triwalls is approximately twice that of both the metal containers and the half crates. This is consistent with the fact that all the triwalls were produced prior to June 1990, when the salt loading was reportedly decreased from 50-55% to 33%. However, the observation that the average salt loading of samples from the metal containers is similar to that of the half crates, but not of the triwalls, can not be explained.

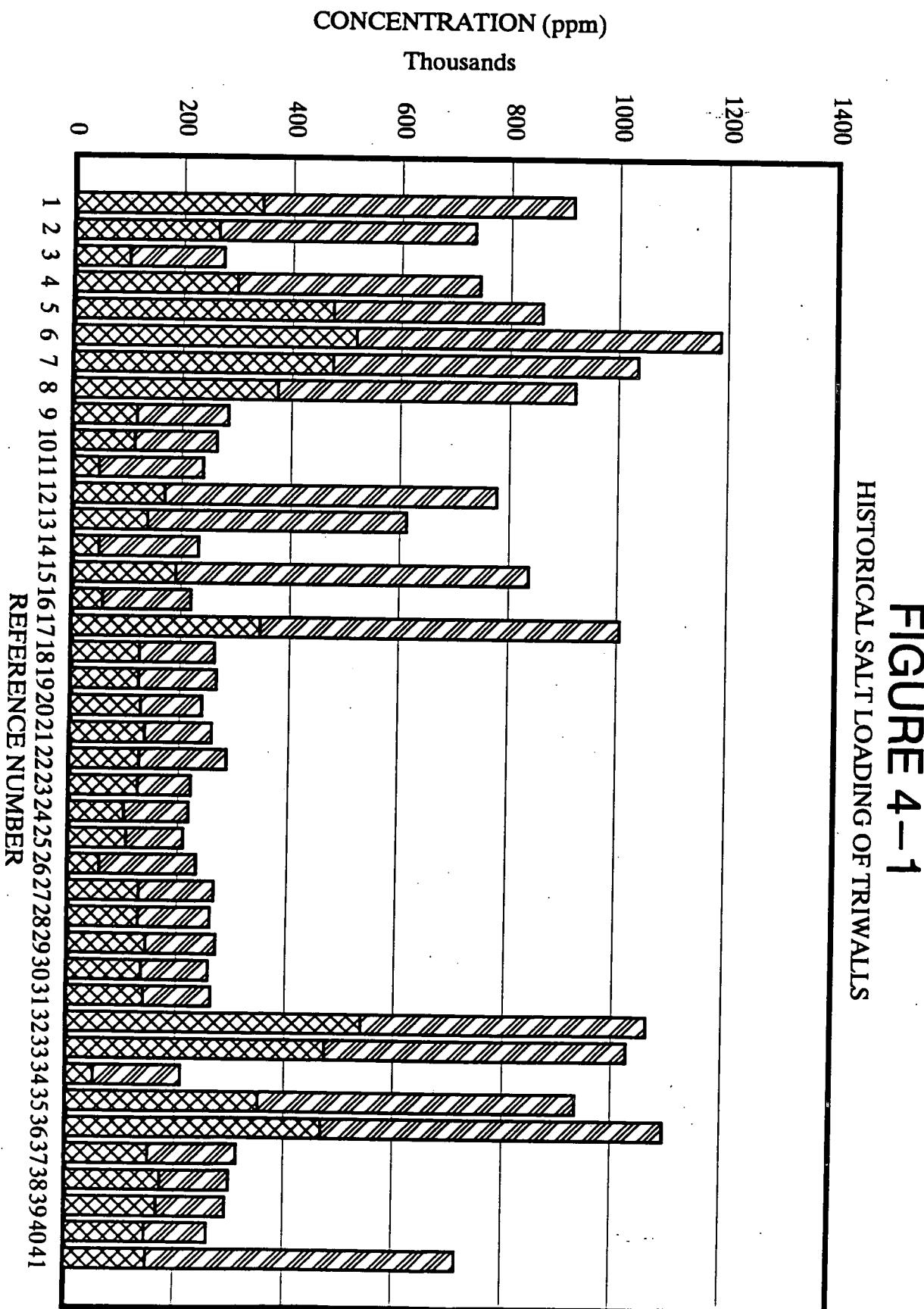


FIGURE 4-1
PAGE TWO

Reference No.	Sample Number	Accumulation Date
1	SC-185XX	10/13/86
2	SC-215XX	12/23/86
3	SC-34XXX	12/26/86
4	SC-25408	01/02/87
5	SC-205XX	02/02/87
6	SC-30408	04/05/87
7	SC-17408	04/10/87
8	SC-195XX	05/22/87
9	SC-355XX	05/27/87
10	SC-33XXX	05/28/87
11	SC-325XX	07/10/87
12	SC-225XX	07/10/87
13	SC-275XX	07/10/87
14	SC-31XXX	09/20/87
15	SC-23408	09/22/87
16	SC-08408	09/28/87
17	SC-26408	10/29/87
18	SC-13408	05/13/88
19	SC-37408	05/13/88
20	SC-02408	05/17/88
21	SC-04408	05/17/88
22	SC-40408	05/18/88
23	SC-38408	05/19/88
24	SC-05410	05/19/88
25	SC-03408	05/22/88
26	SC-435XX	06/07/88
27	SC-14408	06/20/88
28	SC-06410	06/23/88
29	SC-11408	07/04/88
30	SC-09408	07/04/88
31	SC-10408	07/07/88
32	SC-24408	07/07/88
33	SC-29408	08/05/88
34	SC-07408	08/06/88
35	SC-15408	08/17/88
36	SC-16408	08/09/88
37	SC-39408	10/04/88
38	SC-424XX	10/08/88
39	SC-12408	10/10/88
40	SC-12408	10/10/88
41	SC-285XX	06/25/89

FIGURE 4-2
HISTORICAL SALT LOADING OF HALFCRATE

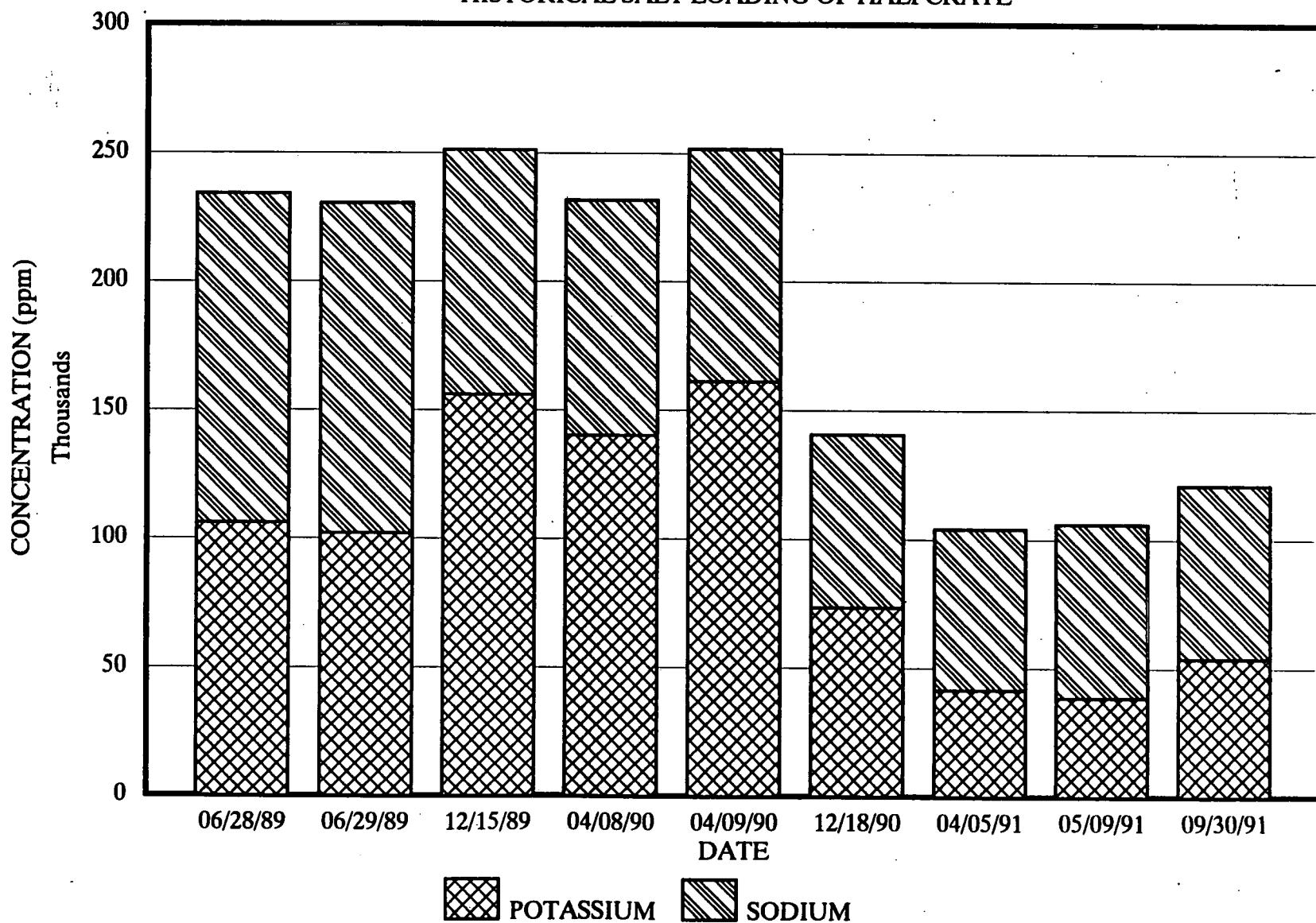
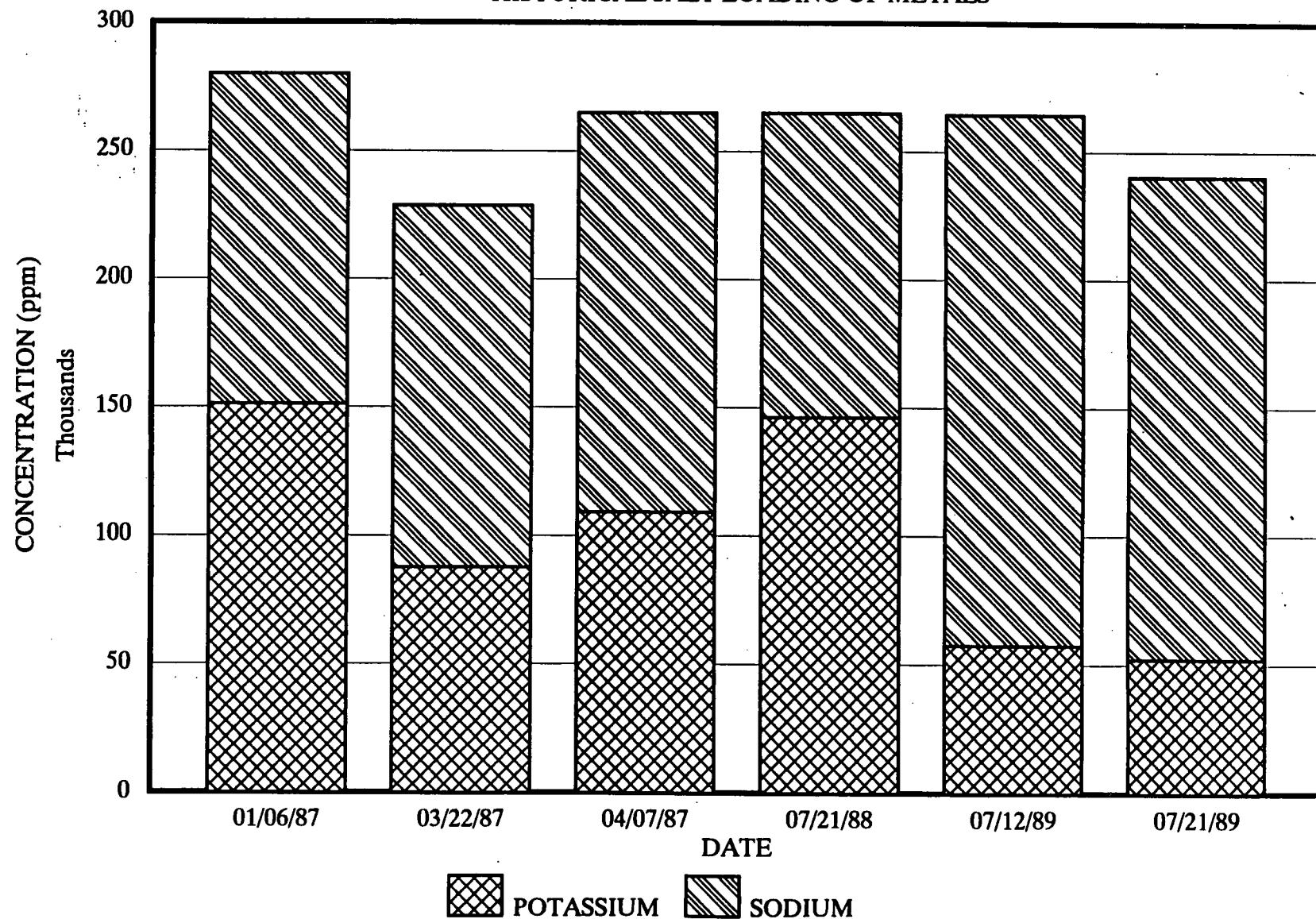


FIGURE 4-3
HISTORICAL SALT LOADING OF METALS



The following conclusions regarding the saltcrete populations can be made based on a review of the salt data:

- The salt loading in the triwalls was more variable than that of the metal containers and the half crates. This is shown graphically in Figure 4-1. The same conclusion can be reached when the data in Section 3 are reviewed. The percent RSD values of individual analytes for the triwalls are generally higher than the metal containers and the half crates, indicating more variability in the data. Also, the range of sodium and potassium values in the triwalls covered an approximate order of magnitude, more than the range for the other two populations.
- The triwall data do not show a change in salt loading during the production period. However, the half crate data clearly supports the reduction in salt loading of saltcrete in June 1990.

4.3 CONCLUSIONS

The following conclusions concerning saltcrete have been made based on the characterization data available to date:

- The characterization data reported in this report are sufficient to characterize the different populations of saltcrete (trivalls, half crate, and metal containers) in support of regulatory compliance and stabilization process development.
- A regulatory evaluation of the saltcrete data was performed. None of the saltcrete samples exceeded toxicity characteristic criteria for RCRA metals. Individual saltcrete samples exceeded LDR criteria for the following parameters:
 - Half crates - amenable cyanide
 - Triwalls - cadmium, nickel, silver
 - Metal Containers - cadmium, nickel, silver

However, when the procedures outlined in Chapter 9 of SW-846 are used to statistically evaluate the database, only the metal container population as a whole exceeds LDR standards (for cadmium, nickel, and silver). The half crate and triwall populations do not exceed LDR standards, although individual samples within the

populations do. Therefore, additional treatment of the half crate and triwall populations for compliance with LDR standards is not required.

- Two individual half crate samples exceeded the LDR standard for amenable cyanide. However, using the procedures outlined in Chapter 9 of SW-846, it was determined that the half crate population as a whole does not exceed the LDR standard. Since the half crate population statistically does not exceed the LDR standard for amenable cyanide, treatment for cyanide destruction during waste stabilization will not be required.
- No volatile organics, semi-volatile organics or alcohols were present at concentrations that could be leached above the LDR Standards. Therefore, these compounds should be deleted from future analytical programs for waste certification.
- The three populations of saltcrete can be combined during treatment. One of the most significant parameters affecting future stabilization of saltcrete is the salt loading in the waste form. The triwall population had both the highest average salt loading and the largest salt loading variability of the three populations. The triwalls also represent the largest of the three populations. Since the half crates and the metal container waste have lower salt loadings, the addition of these wastes to the triwalls during processing would serve mainly to reduce the salt loading of the final mix, which is almost certainly beneficial for the performance of a stabilization process.

REFERENCES

HALLIBURTON NUS, October 1991. Combined Deliverable 211B, 211C, 221B and 221C "Saltcrete Sampling and Analysis Plan".

HALLIBURTON NUS, October 1991. Deliverable 212C "Saltcrete Inventory Sampling Procedure".

Rockwell International, November 1989. "Rocky Flats Plant Low-Level Mixed Waste Plan".

APPENDIX A

**SUMMARY OF PROPOSED SALTCRETE SAMPLE COLLECTION
COMPARED WITH ACTUAL SAMPLE COLLECTION**

APPENDIX A

The information in this appendix provides details on the sampling activities conducted for Saltcrete. Table A-1 summarizes the number of samples proposed compared to the samples which were actually collected with regards to pad number (i.e., Pad 904 or Pad 750). Referenced in Table A-1 are Figures A-1 to A-6 which provide locations of the proposed and actual samples with regards to pad, tent, and stack location.

Table A-2 provides a summary of all of the samples collected and the location from which they originated. In Table A-2, the sample number ends with either a T, H, or M, which corresponds to Triwalls, Half Crates, or Metals, respectively. Table A-2 also provides a summary of the production date (accumulation date).

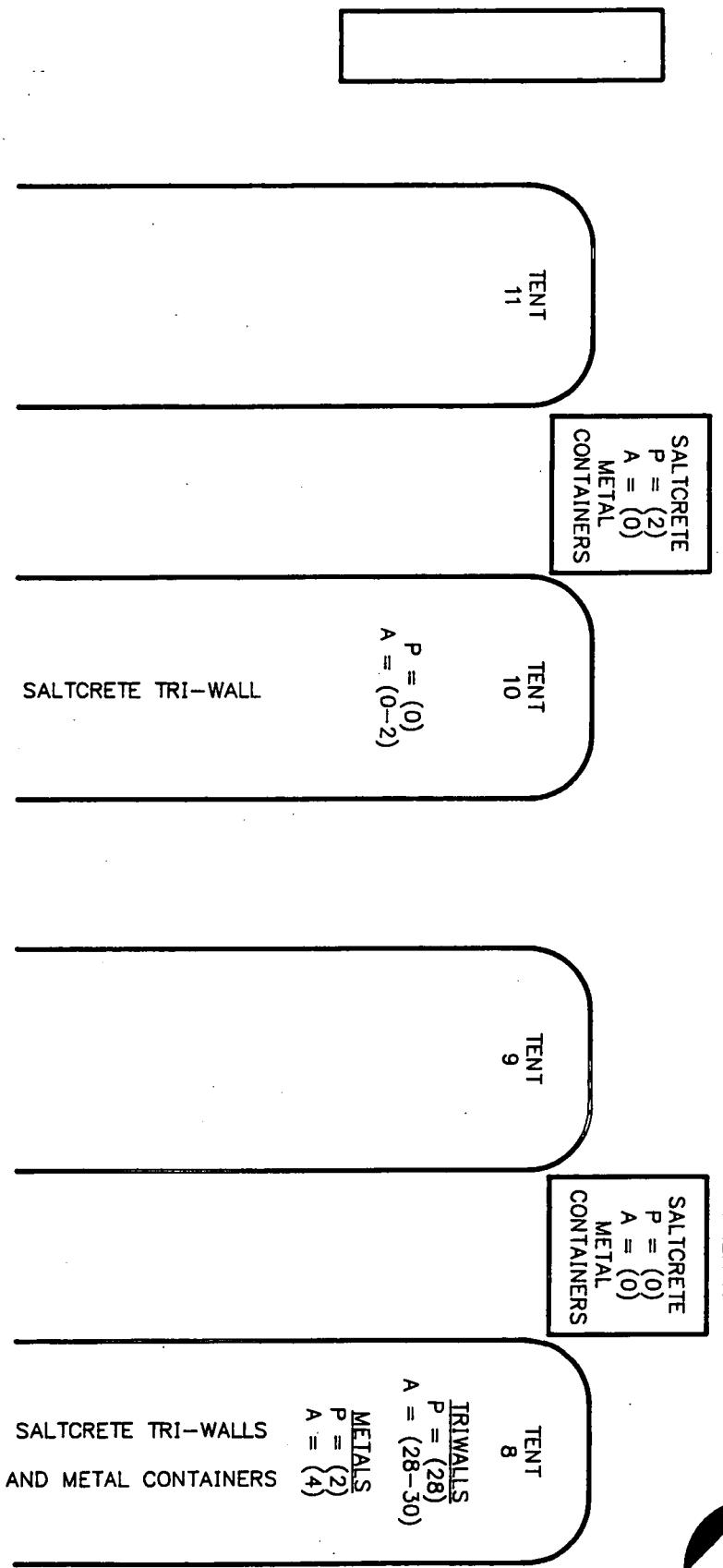
Table A-3 provides a summary of the sample tool used to collect each sample. The sample numbers correspond to the sample numbers provided in Table A-2.

TABLE A-1

**SALTCRETE SAMPLING SUMMARY
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO**

Subgroup/ Container Type	904 Pad			750 Pad			Samples from Unconfirmed Pad Location
	Proposed No. of Samples	Confirmed No. of Samples	Figure References in Text	Proposed No. of Samples	Confirmed No. of Samples	Figure References in Text	
Tri-Wall	28	29	A-1, A-2	14	12	A-3, A-4	1
Half Crate	0	0	NA	12	12	A-3, A-5, and A-6	0
Tri-Wall in Metal Container	4	4	A-1, A-2	2	2	A-3, A-6	0

NA - Not Applicable



P = NUMBER OF PROPOSED SAMPLES
A = ACTUAL NUMBER OF SAMPLES COLLECTED

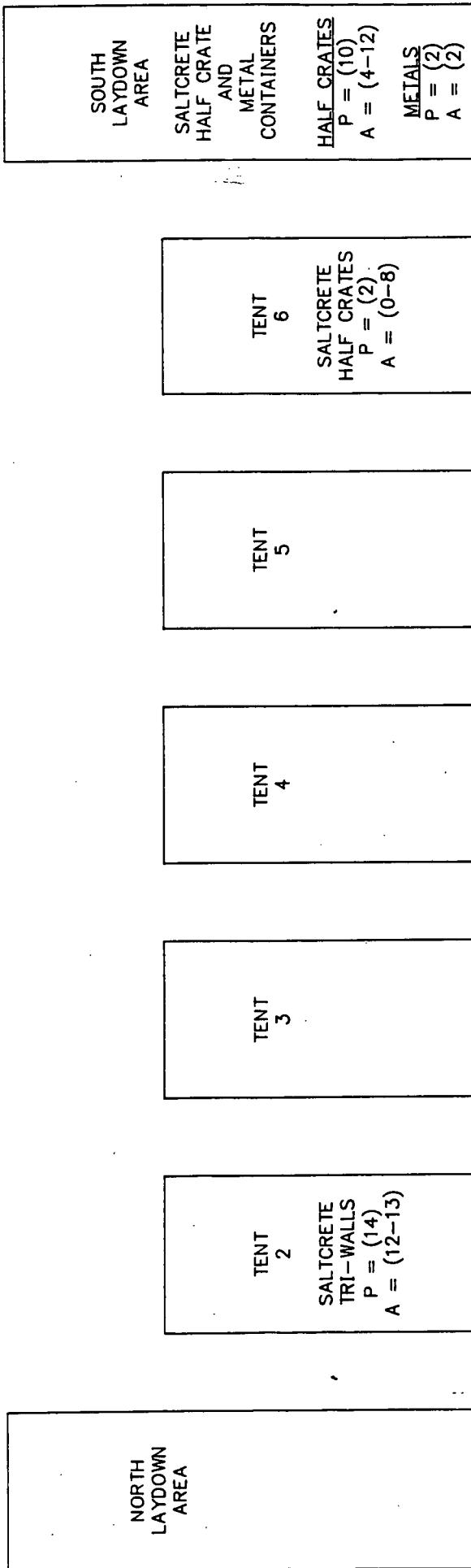
LEGEND

THE PROPOSED AND ACTUAL NUMBER OF
SALTCRETE SAMPLES COLLECTED BY LOCATION
WITHIN THE CONFINES OF PAD 904
ROCKY FLATS, COMPLEX, COLORADO

NOT TO SCALE

FIGURE A-1





LEGEND

P = NUMBER OF PROPOSED SAMPLES
A = ACTUAL NUMBER OF SAMPLES COLLECTED

**THE PROPOSED AND ACTUAL NUMBER OF
SALTCRETE SAMPLES COLLECTED BY LOCATION
WITHIN THE CONFINES OF PAD 750
ROCKY FLATS COMPLEX, COLORADO**

FIGURE A-3



TABLE A-2
SAMPLE COLLECTION SUMMARY - SALTCRETE
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO

Sample Number	Sample Origin					Container Type	Sample Type	Date Sampled	Accumulation Date
	Pad No.	Tent No.	Stack	Container ID	Triwall No.				
SC-01408-M	904	8	Q	M00818	748-04099	METAL	ROUTINE	01-07-92	07-21-88
SC-02408-T-T	NA	NA	NA	NA	NA	NA	TRIP BLANK(1)	01-13-92	NA
SC-02408-T	904	8	G	NA	03873	TRIWALL	ROUTINE	01-13-92	05-17-88
SC-03408-T	904	8	I	NA	03912	TRIWALL	ROUTINE	01-13-92	05-22-88
SC-03408-T-D	904	8	I	NA	03912	TRIWALL	DUPLICATE	01-13-92	05-22-88
SC-04408-T	904	8	G	NA	03874	TRIWALL	ROUTINE	01-13-92	05-17-88
SC-05410-T	904	8	F	NA	03890	TRIWALL	ROUTINE	01-13-92	05-19-88
SC-06410-T	904			NA	03956	TRIWALL	ROUTINE	01-13-92	06-23-88
SC-07408-T	904	8	F	NA	04226	TRIWALL	ROUTINE	01-14-92	08-06-88
SC-08408-T	904	8	H	NA	13524	TRIWALL	ROUTINE	01-14-92	09-28-87
SC-09408-T	904	8	J	NA		TRIWALL	ROUTINE	01-14-92	07-04-88
SC-10408-T	904	8	H	NA	04031	TRIWALL	ROUTINE	01-14-92	07-07-88
SC-11408-T	904	8	J	NA	04059	TRIWALL	ROUTINE	01-14-92	07-04-88
SC-12408-T	904	8		NA	04436	TRIWALL	ROUTINE	01-14-92	10-10-88
SC-13408-T	904	8	O	NA	03831	TRIWALL	ROUTINE	01-14-92	05-13-88
SC-14408-T	904	8	O	NA	03937	TRIWALL	ROUTINE	01-14-92	06-20-88
SC-14408-T-T-W	NA	NA	NA	NA	NA	NA	TRIP BLANK (2)	01-15-92	NA

TABLE A-2
SAMPLE COLLECTION SUMMARY - SALTCRETE
PAGE 2

Sample Number	Sample Origin					Container Type	Sample Type	Date Sampled	Accumulation Date
	Pad No.	Tent No.	Stack	Container ID	Triwall No.				
SC-14408-T-F	NA	NA	NA	NA	NA	NA	FIELD BLANK	01-15-92	NA
SC-14408-T-B	NA	NA	NA	NA	NA	NA	RINSATE BLANK	01-15-92	NA
SC-15408-T-T	NA	NA	NA	NA	NA	NA	TRIP BLANK (1)	01-15-92	NA
SC-15408-T	904	8	B	NA	04174	TRIWALL	ROUTINE	01-15-92	08-17-88
SC-16408-T	904	8	B	NA	04162	TRIWALL	ROUTINE	01-15-92	08-09-88
SC-17408-T	904	8	O	NA	02828	TRIWALL	ROUTINE	01-15-92	04-10-87
SC-185XX-T	750			NA	02225	TRIWALL	ROUTINE	01-15-92	10-13-86
SC-195XX-T	750	2	E	NA	03011	TRIWALL	ROUTINE	01-15-92	05-22-87
SC-205XX-T	750	2	F	NA	02585	TRIWALL	ROUTINE	01-16-92	02-02-87
SC-215XX-T	750	2	F	NA	02237	TRIWALL	ROUTINE	01-16-92	12-23-86
SC-225XX-T	750	2	E	NA	03137	TRIWALL	ROUTINE	01-16-92	07-10-87
SC-23408-T	904	8	C	NA	03456	TRIWALL	ROUTINE	01-16-92	09-22-87
SC-24408-T	904	8	C	NA	04084	TRIWALL	ROUTINE	01-16-92	07-07-88
SC-25408-T	904	8	C	NA	02549	TRIWALL	ROUTINE	01-16-92	01-02-87
SC-26408-T	904	8		NA	03653	TRIWALL	ROUTINE	01-16-92	10-29-87
SC-275XX-T	750			NA	03125	TRIWALL	ROUTINE	01-16-92	07-10-87
SC-285XX-T				NA		TRIWALL	ROUTINE	01-16-92	06-25-89

TABLE A-2

SAMPLE COLLECTION SUMMARY - SALTCRETE

PAGE 3

Sample Number	Sample Origin					Container Type	Sample Type	Date Sampled	Accumulation Date
	Pad No.	Tent No.	Stack	Container ID	Triwall No.				
SC-29408-T	904	8	B	NA	04160	TRIWALL	ROUTINE	01-16-92	08-05-88
SC-30408-T	904	8	C	NA	02793	TRIWALL	ROUTINE	01-16-92	04-05-87
SC-31XXX-T-T	NA	NA	NA	NA	N/A	N/A	TRIP BLANK (1)	01-20-92	NA
SC-31XXX-T	750	2	F	NA	03440	TRIWALL	ROUTINE	01-20-92	09-20-87
SC-325XX-T	750	2	D	NA	02410	TRIWALL	ROUTINE	01-20-92	07-10-87
SC-33XXX-T	750	2	E	NA	03018	TRIWALL	ROUTINE	01-20-92	05-28-87
SC-34XXX-T	904	8	C	NA	02539	TRIWALL	ROUTINE	01-20-92	12-26-86
SC-355XX-T	750	2	D	NA	03037	TRIWALL	ROUTINE	01-20-92	05-27-87
SC-355XX-T-T-W	NA	NA	NA	NA	NA	NA	TRIP BLANK (2)	01-20-92	NA
SC-355XX-T-F	NA	NA	NA	NA	NA	NA	FIELD BLANK	01-20-92	NA
SC-355XX-T-B	NA	NA	NA	NA	NA	NA	RINSATE BLANK	01-20-92	NA
SC-36408-T	904	8	H	NA	04634	TRIWALL	ROUTINE	01-20-92	12-11-88
SC-37408-T	904	8	H	NA	03817	TRIWALL	ROUTINE	01-20-92	05-13-88
SC-37408-T-D	904	8	H	NA	03817	TRIWALL	DUPLICATE	01-20-92	05-13-88
SC-38408-T	904	8	O	NA	03886	TRIWALL	RINSATE	01-20-92	05-19-88
SC-39408-T	904	8	C	NA	04381	TRIWALL	ROUTINE	01-20-92	10-04-88
SC-40408-T	904	8	O	NA	03882	TRIWALL	ROUTINE	01-20-92	05-18-88

TABLE A-2

SAMPLE COLLECTION SUMMARY - SALTCRETE

PAGE 4

Sample Number	Sample Origin					Container Type	Sample Type	Date Sampled	Accumulation Date
	Pad No.	Tent No.	Stack	Container ID	Triwall No.				
SC-41408-M	904	8	Q	M00818	04099	METAL	ROUTINE	01-21-92	01-06-87
SC-41408-M-D	904	8	Q	M00818	04099	METAL	DUPLICATE	01-20-92	01-06-87
SC-41408-M-F	NA	NA	NA	NA	NA	NA	FIELD BLANK	01-20-92	NA
SC-41408-M-B	NA	NA	NA	NA	NA	NA	RINSATE BLANK	01-20-92	NA
SC-424XX-T	904	8	B	NA	04440	TRIWALL	ROUTINE	01-20-92	10-08-88
SC-424XX-T-F	NA	NA	NA	NA	NA	NA	FIELD BLANK	01-20-92	NA
SC-435XX-T	750	2	D	NA	03287	TRIWALL	ROUTINE	01-20-92	06-07-87
SC-435XX-T-D	750	2	D	NA	03287	TRIWALL	DUPLICATE	01-20-92	06-07-87
SC-445XX-T	750	2	D	NA	03093	TRIWALL	ROUTINE	01-20-92	UNKNOWN
SC-445XX-T-B	NA	NA	NA	NA	NA	NA	RINSATE BLANK	01-20-92	NA
SC-455XX-H	750			776-A-5560	NA	HALF CRATE	ROUTINE	01-27-92	06-29-89
SC-455XX-H-D	750			776-A-5560	NA	HALF CRATE	DUPLICATE	01-27-92	06-29-89
SC-455XX-H-T	NA	NA	NA	NA	NA	NA	TRIP BLANK (1)	01-27-92	NA
SC-465XX-H	750			748-00032	NA	HALF CRATE	ROUTINE	01-27-92	12-15-89
SC-465XX-H-T-W	NA	NA	NA	NA	NA	NA	TRIP BLANK (2)	01-27-92	NA
SC-475XX-H	750	SLA	H	H00264	NA	HALF CRATE	ROUTINE	01-27-92	04-08-90
SC-485XX-H	750			H03453	NA	HALF CRATE	ROUTINE	01-27-92	04-05-91

TABLE A-2

SAMPLE COLLECTION SUMMARY - SALTCRETE

PAGE 5

Sample Number	Sample Origin					Container Type	Sample Type	Date Sampled	Accumulation Date
	Pad No.	Tent No.	Stack	Container ID	Triwall No.				
SC-485XX-H-F	NA	NA	NA	NA	NA	NA	FIELD BLANK	01-20-92	NA
SC-485XX-H-B	NA	NA	NA	NA	NA	NA	RINSATE BLANK	01-27-92	NA
SC-495XX-H	750	SLA	J	H03202	NA	HALF CRATE	ROUTINE	01-27-92	UNKNOWN
SC-505XX-H	750	SLA	J	H00198	NA	HALF CRATE	ROUTINE	01-27-92	UNKNOWN
SC-515XX-H	750			748-00466	NA	HALF CRATE	ROUTINE	01-28-92	09-30-91
SC-525XX-H	750			776-A-6189	NA	HALF CRATE	ROUTINE	01-28-92	06-28-89
SC-535XX-H	750			H0776-A-5441	NA	HALF CRATE	ROUTINE	01-28-92	UNKNOWN
SC-545XX-H	750	SLA	H	H00277	NA	HALF CRATE	ROUTINE	01-28-92	04-09-90
SC-555XX-H	750			H03509	NA	HALF CRATE	ROUTINE	01-28-92	05-09-91
SC-565XX-H	750			H03211	NA	HALF CRATE	ROUTINE	01-28-92	12-18-90
SC-57408-M	904	8	Q	M00661	02739	METAL	ROUTINE	01-28-92	03-22-87
SC-58408-M	904	8	Q	M00661	02804	METAL	ROUTINE	01-28-92	04-07-87
SC-595XX-M-T	NA	NA	NA	NA	NA	N/A	TRIP BLANK(1)	01-30-92	NA
SC-595XX-M	750			M00424	748-03257	METAL	ROUTINE	01-30-92	07-21-89
SC-605XX-M	750			M00424	748-3226	METAL	ROUTINE	01-30-92	07-12-89

TABLE A-2
SAMPLE COLLECTION SUMMARY - SALTCRETE
PAGE 6

KEY

- (1) Trip Blank accompanied Routine and Duplicate Saltcrete Samples.
 - (2) Trip Blank accompanied Aqueous samples (i.e., Rinsate & Field Blanks).
- SLA South Laydown Area.
NA Not Applicable

TABLE A-3
EQUIPMENT USED IN THE COLLECTION OF SALTCRETE SAMPLES
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO

Sample Number	Chemical Sample Collection Equipment									Physical Sample Collection Equipment			
										Shelby Tube			Sample Jar
	Mallet	Trowel*	Chisel*	Drill	Spoon*	Glove (Disposable)	Shovel*	Hammer	Bucket*	Sledge Hammer Driven	Forklift Pushed	Hand Pushed	Same As Chemical
SC-01408-M	X	X								X	X		
SC-02408-T	X	X	X							X	X		
SC-03408-T	X	X	X							X	X		
SC-04408-T		X	X							X	X		
SC-05410-T	X			X	X					X	X		
SC-06410-T		X	X							X	X		
SC-07408-T			X				X	X	X	X			
SC-08408-T			X				X	X	X	(1)	(1)	(1)	
SC-09408-T			X				X	X	X	(1)	(1)	(1)	
SC-10408-T	X	X	X							X	X		
SC-11408-T	X	X	X							X	X		
SC-12408-T		X	X							X	X		
SC-13408-T		X	X							X	X		
SC-14408-T	X	X	X							X	X		

TABLE 4-3

SAMPLE COLLECTION SUMMARY - SALTCRETE

PAGE 2

Sample Number	Chemical Sample Collection Equipment									Physical Sample Collection Equipment			
	Mallet	Trowel*	Chisel*	Drill	Spoon*	Glove (Disposable)	Shovel*	Hammer	Bucket*	Shelby Tube		Sample Jar	
										Sledge Hammer Driven	Forklift Pushed	Hand Pushed	Same As Chemical
SC-15408-T		X	X							X	X		
SC-16408-T	X	X	X							X	X		
SC-17408-T		X	X							X	X		
SC-185XX-T		X	X							X	X		
SC-195XX-T		X	X							X	X		
SC-205XX-T	X			X						X		X	
SC-215XX-T			X							X	X		X
SC-225XX-T		X								X		X	
SC-23408-T	X									X	X		
SC-24408-T	X			X	X					X			X
SC-25408-T	X	X	X							X	X		
SC-26408-T	X	X	X							X	X		
SC-275XX-T						X				X	X		
SC-285XX-T						X				X			X
SC-29408-T	X		X			X				X	X		

TABLE 4-3
SAMPLE COLLECTION SUMMARY - SALTCRETE
PAGE 3

Sample Number	Chemical Sample Collection Equipment									Physical Sample Collection Equipment			
	Mallet	Trowel*	Chisel*	Drill	Spoon*	Glove (Disposable)	Shovel*	Hammer	Bucket*	Shelby Tube		Sample Jar	
										Sledge Hammer Driven	Forklift Pushed	Hand Pushed	Same As Chemical
SC-30408-T	X	X	X						X				X
SC-31XXX-T	X	X	X							X	X		
SC-325XX-T	X	X	X							X	X	X	
SC-33XXX-T	X		X							X	X	X	
SC-34XXX-T		X	X							X		X	
SC-355XX-T		X	X							X		X	
SC-36408-T		X	X							X	X		
SC-37408-T		X	X		X					X	X		
SC-38408-T	X	X	X							X	X		
SC-39408-T		X	X							X	X		
SC-40408-T			X	X					X	X	X		
SC-41408-M	X		X					X		X	X		X
SC-424XX-T		X						X		X		X	
SC-435XX-T					X					X	X		
SC-445XX-T					X					X	X		

TABLE 4-3
SAMPLE COLLECTION SUMMARY - SALTCRETE
PAGE 4

Sample Number	Chemical Sample Collection Equipment									Physical Sample Collection Equipment			
	Mallet	Trowel*	Chisel*	Drill	Spoon*	Glove (Disposable)	Shovel*	Hammer	Bucket*	Shelby Tube		Sample Jar	
										Sledge Hammer Driven	Forklift Pushed	Hand Pushed	Same As Chemical
SC-455XX-H	X									X			X
SC-465XX-H	X									X			X
SC-475XX-H	X					X				X			X
SC-485XX-H	X			X						X			X
SC-495XX-H	X								X	X			X
SC-505XX-H	X									X			X
SC-515XX-H					X					X	X		X
SC-525XX-H				X						X	X		X
SC-535XX-H				X						X	X		X
SC-545XX-H				X						X	X	X	
SC-555XX-H	X			X	X					X			X
SC-565XX-H	X			X						X			X
SC-57408-M				X						X	X		
SC-58408-M				X			X			X	X		
SC-595XX-M								X		X	X		

TABLE 4-3

SAMPLE COLLECTION SUMMARY - SALTCRETE

PAGE 5

Sample Number	Chemical Sample Collection Equipment									Physical Sample Collection Equipment			
										Shelby Tube		Sample Jar	
	Mallet	Trowel*	Chisel*	Drill	Spoon*	Glove (Disposable)	Shovel*	Hammer	Bucket*	Sledge Hammer Driven	Forklift Pushed	Hand Pushed	Same As Chemical
SC-605XX-M							X		X	X			

KEY

(1) Unknown

* Stainless Steel Equipment.

APPENDIX B
ANALYTICAL DATABASE

TITLE: HALCRATE

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC455XXH SC455XXHD SC465XXH SC475XXH SC485XXH SC495XXH
06/29/89 06/29/89 12/15/89 04/08/90 04/05/90 UNKNOWN
01/27/92 01/27/92 01/27/92 01/27/92 01/27/72 01/27/92

*** VOLATILES ***

COMPOUND

METHYLENE CHLORIDE	6U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG
ACETONE	19U	UG/KG	24U	UG/KG	25U	UG/KG	37U	UG/KG	130U	UG/KG	140U	UG/KG
CARBON DISULFIDE	6U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG
1,1-DICHLOROETHENE	6U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG
2-BUTANONE	12U	UG/KG	12U	UG/KG	13U	UG/KG	4J	UG/KG	36	UG/KG	45	UG/KG
1,1,1-TRICHLORETHANE	6U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG
CARBON TETRACHLORIDE	6U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG
TRICHLOROETHENE	6U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG
1,1,2-TRICHLOROETHANE	6U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG
BENZENE	6U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG
4-METHYL-2-PENTANONE	12U	UG/KG	12U	UG/KG	13U	UG/KG	13U	UG/KG	13U	UG/KG	13U	UG/KG
TETRACHLOROETHENE	6U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG
TOLUENE	6U	UG/KG	6U	UG/KG	7U	UG/KG	5J	UG/KG	7U	UG/KG	8	UG/KG
CHLOROBENZENE	6U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG
ETHYLBENZENE	6U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG
XYLENE (total)	6U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG
TRICHLOROFLUOROMETHANE	6U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG
FREON 113	6U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG	14	UG/KG
ETHYL ETHER	6U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG
ETHYL ACETATE	6U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG	6U	UG/KG

*** SEMIVOLATILES ***

COMPOUND

1,4-DICHLOROBENZENE	410UJ	UG/KG	410U	UG/KG	430U	UG/KG	420U	UG/KG	430U	UG/KG	430U	UG/KG
1,2-DICHLOROBENZENE	410UJ	UG/KG	410U	UG/KG	430U	UG/KG	420U	UG/KG	430U	UG/KG	430U	UG/KG
N-NITROSO-DI-N-PROPYLAMINE	410UJ	UG/KG	410U	UG/KG	430U	UG/KG	420U	UG/KG	430U	UG/KG	430U	UG/KG
1,2,4-TRICHLOROBENZENE	410UJ	UG/KG	410U	UG/KG	430U	UG/KG	420U	UG/KG	430U	UG/KG	430U	UG/KG
ACENAPHTHENE	410UJ	UG/KG	410U	UG/KG	430U	UG/KG	420U	UG/KG	430U	UG/KG	430U	UG/KG
2,4-DINITROTOLUENE	410UJ	UG/KG	410U	UG/KG	430U	UG/KG	420U	UG/KG	430U	UG/KG	430U	UG/KG
PYRENE	410UJ	UG/KG	410U	UG/KG	430U	UG/KG	420U	UG/KG	430U	UG/KG	430U	UG/KG
CYCLOHEXANONE	410UJ	UG/KG	410U	UG/KG	430U	UG/KG	420U	UG/KG	430U	UG/KG	430U	UG/KG
PYRIDINE	410UJ	UG/KG	410U	UG/KG	430U	UG/KG	420U	UG/KG	430U	UG/KG	430U	UG/KG
2-NITROPROPANE	410UJ	UG/KG	410U	UG/KG	430U	UG/KG	420U	UG/KG	430U	UG/KG	430U	UG/KG

TITLE: HALCRATE

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC455XXH 06/29/89 01/27/92	SC455XXHD 06/29/89 01/27/92	SC465XXH 12/15/89 01/27/92	SC475XXH 04/08/90 01/27/92	SC485XXH 04/05/90 01/27/72	SC495XXH UNKNOWN 01/27/92
		DUPLICATE			

*** ALCOHOLS ***

COMPOUND

| 2-ETHOXYETHANOL | <500 MG/KG |
|-----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| ISOBUTANOL | <10 MG/KG |
| METHANOL | <10 MG/KG |
| N-BUTYL ALCOHOL | <10 MG/KG |

*** INORGANICS ***

ANALYTE

ALUMINUM	6650 MG/KG	6730 MG/KG	6820 MG/KG	8230 MG/KG	11900 MG/KG	10600 MG/KG
ARSENIC	7.4U MG/KG	7.4U MG/KG	7.9U MG/KG	7.7U MG/KG	7.9U MG/KG	7.8 MG/KG
BARIUM	134 MG/KG	135 MG/KG	143J MG/KG	154 MG/KG	275J MG/KG	237J MG/KG
CADMIUM	3.7J MG/KG	3.6J MG/KG	3.8J MG/KG	4.2J MG/KG	2.8J MG/KG	3.4J MG/KG
CALCIUM	148000 MG/KG	148000 MG/KG	151000J MG/KG	183000 MG/KG	282000J MG/KG	240000J MG/KG
CHROMIUM	36.5J MG/KG	37.8J MG/KG	30.2J MG/KG	33.6J MG/KG	118J MG/KG	52.2J MG/KG
IRON	6920J MG/KG	6990J MG/KG	6950J MG/KG	8690J MG/KG	12300J MG/KG	10400J MG/KG
LEAD	2.5U MG/KG	2.5U MG/KG	5.1U MG/KG	4.1U MG/KG	5.8U MG/KG	5.5U MG/KG
MAGNESIUM	1780J MG/KG	1800J MG/KG	1930J MG/KG	2650J MG/KG	8490J MG/KG	5790J MG/KG
MERCURY	0.1U MG/KG	0.1 MG/KG	0.1U MG/KG	0.1 MG/KG	0.1 MG/KG	0.1 MG/KG
NICKEL	26.2 MG/KG	27.7 MG/KG	22.4 MG/KG	24.5 MG/KG	36.5 MG/KG	45.8 MG/KG
POTASSIUM	101000J MG/KG	103000J MG/KG	156000J MG/KG	140000J MG/KG	41600J MG/KG	84600J MG/KG
SELENIUM	9.9U MG/KG	9.9U MG/KG	10.6U MG/KG	10.3U MG/KG	10.6U MG/KG	10.4U MG/KG
SILVER	38.7J MG/KG	39.3J MG/KG	43.9J MG/KG	30.4J MG/KG	30.1J MG/KG	18.2 MG/KG
SODIUM	127000 MG/KG	130000 MG/KG	95300 MG/KG	91600 MG/KG	62300 MG/KG	78600 MG/KG
BORON	133J MG/KG	133J MG/KG	95.8J MG/KG	104J MG/KG	104J MG/KG	164J MG/KG

*** TCLP INORGANICS ***

ANALYTE

ALUMINUM	521 UG/L	NA	932 UG/L	385 UG/L	98.0 UG/L	129 UG/L
ARSENIC	128U UG/L	NA	89.0U UG/L	68.0U UG/L	102U UG/L	122U UG/L
BARIUM	956J UG/L	NA	892J UG/L	1470J UG/L	1500J UG/L	1400J UG/L
CADMIUM	5.0U UG/L	NA	5.0U UG/L	5.0U UG/L	5.0U UG/L	5.0U UG/L
CALCIUM	1840000 UG/L	NA	6330000 UG/L	954000 UG/L	3120000 UG/L	2470000 UG/L
CHROMIUM	260 UG/L	NA	463 UG/L	449J UG/L	953 UG/L	218 UG/L
IRON	83.0U UG/L	NA	196U UG/L	95.0U UG/L	34.0U UG/L	43.0U UG/L
LEAD	22.0U UG/L	NA	20.0UJ UG/L	30.0U UG/L	20.0UJ UG/L	25.0U UG/L
MAGNESIUM	108U UG/L	NA	41.0U UG/L	81.0U UG/L	191 UG/L	145U UG/L
MERCURY	0.1U UG/L	NA	1.0 UG/L	1.0 UG/L	0.1U UG/L	0.1U UG/L
NICKEL	75.0 UG/L	NA	64.0 UG/L	71.0 UG/L	101 UG/L	118 UG/L
SELENIUM	80.0U UG/L	NA	80.0U UG/L	80.0U UG/L	80.0U UG/L	80.0U UG/L
SILVER	R UG/L	NA	R UG/L	3.0U UG/L	R UG/L	R UG/L
pH	11.8	NA	12.1	12.2	12.0	12.2

TITLE: HALCRATE

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC455XXH SC455XXHD SC465XXH SC475XXH SC485XXH SC495XXH
06/29/89 06/29/89 12/15/89 04/08/90 04/05/90 UNKNOWN
01/27/92 01/27/92 01/27/92 01/27/92 01/27/92 01/27/92
DUPLICATE

L.C.
Elmer S.

*** MISCELLANEOUS ***

PARAMETER

CYANIDE-AMENABLE	+4.3J	MG/KG	+17J	MG/KG	-15	MG/KG	+48	MG/KG	+56	MG/KG	-24	MG/KG
CYANIDE-TOTAL	21J	MG/KG	60J	MG/KG	34	MG/KG	81	MG/KG	81	MG/KG	28	MG/KG
GROSS ALPHA	99+/-17	pCi/g	140+/-20	pCi/g	85+/-15	pCi/g	58+/-13	pCi/g	68+/-14	pCi/g	20+/-9	pCi/g
GROSS BETA	130+/-20	pCi/g	120+/-20	pCi/g	130+/-20	pCi/g	120+/-20	pCi/g	66+/-7	pCi/g	92+/-10	pCi/g
pH	12.9		13.1		13.3		13.3		12.7		13.0	
AMMONIA	<10	MG/KG	<20	MG/KG	14	MG/KG	<10	MG/KG	15	MG/KG	22	MG/KG
MOISTURE - GRAVIMETRIC	18.8	%	19.0	%	24.2	%	22.0	%	24.3	%	23.0	%
TOC	5000	MG/KG	4900	MG/KG	4400	MG/KG	4100	MG/KG	2000	MG/KG	1300	MG/KG
SWELL TEST	0	%	NA		10	%	10	%	40	%	30	%
BULK DENSITY	1.95		NA		1.88		1.93		1.67		1.83	
UNCONFINED COMPRESSIVE STRENG	NA		NA		NA		NA		NA		NA	
UNIT WEIGHT OF SHELBY TUBE	NA		NA		NA		NA		NA		NA	
FLT CAKE-SPEC GRAV	2.62		NA		2.77		2.70		2.13		2.53	
FLT CAKE-SPEC GRAV (SALT RINS)	2.36		NA		2.28		2.17		1.93		2.05	
VISCOSITY	125	CP	NA		275	CP	285	CP	335	CP	140	CP
% WATER (KARL FISHER)	18.4	%	NA		24.4	%	24.3	%	24.2	%	22.3	%
% SOLIDS (FILTERCAKE)	81.0	%	NA		75.8	%	77.8	%	75.7	%	79.1	%
GRAIN SIZE - SIEVE 3/4 IN	NA		NA		NA		NA		100.0	%	NA	
GRAIN SIZE - SIEVE 3/8 IN	100.0	%	NA		100.0	%	100.0	%	97.7	%	INT	
GRAIN SIZE - SIEVE NO. 4	98.1	%	NA		99.7	%	90.8	%	77.5	%	INT	
GRAIN SIZE - SIEVE NO. 10	58.3	%	NA		87.6	%	59.4	%	51.9	%	INT	
GRAIN SIZE - SIEVE NO. 20	33.3	%	NA		41.7	%	33.5	%	36.3	%	INT	
GRAIN SIZE - SIEVE NO. 40	NA		NA		NA		NA		NA		NA	
GRAIN SIZE - SIEVE NO. 50	19.8	%	NA		22.4	%	20.0	%	20.1	%	INT	
GRAIN SIZE - SIEVE NO. 100	11.7	%	NA		11.3	%	13.0	%	11.3	%	INT	
GRAIN SIZE - SIEVE NO. 140	NA		NA		NA		NA		NA		NA	
GRAIN SIZE - SIEVE NO. 200	4.2	%	NA		3.5	%	5.2	%	4.1	%	INT	
PYCNOMETER FIL - SPEC. GRAV.	1.053		NA		1.053		1.048		1.028		1.033	
PYCNOMETER FIL - SOLIDS DISS.	74000	MG/L	NA		69000	MG/L	62000	MG/L	36000	MG/L	46000	MG/L
PYCNOMETER FIL - pH	12.6		NA		12.9		12.9		12.4		12.6	
SALT RINSE FIL - SPEC. GRAV.	1.083		NA		1.083		1.073		1.043		1.053	
SALT RINSE FIL - SOLIDS DISS.	120000	MG/L	NA		100000	MG/L	100000	MG/L	57000	MG/L	74000	MG/L
SALT RINSE FIL - pH	12.8		NA		13.0		12.9		12.4		12.7	

TITLE: HALCRATE

SAMPLE ID NUMBER:	SC455XXH	SC455XXHD	SC465XXH	SC475XXH	SC485XXH	SC495XXH
ACCUMULATION DATE:	06/29/89	06/29/89	12/15/89	04/08/90	04/05/90	UNKNOWN
DATE SAMPLED:	01/27/92	01/27/92	01/27/92	01/27/92	01/27/72	01/27/92
COMMENT:	DUPLICATE					

*** ASTM LEACHATES ***

PARAMETER

CHLORIDE	1000	MG/L	NA	1200	MG/L	2000	MG/L	690	MG/L	1200	MG/L
NITRATE	2300	MG/L	NA	1100	MG/L	1000	MG/L	1100	MG/L	920	MG/L
PERCENT RECOVERY OF SOLIDS	27.2	%	NA	34.6	%	40.2	%	54.8	%	51.8	%
PHOSPHORUS	<0.01	MG/L	NA	<0.01	MG/L	<0.01	MG/L	<0.01	MG/L	<0.01	MG/L
SULFATE	2100	MG/L	NA	4100	MG/L	2300	MG/L	1100	MG/L	1400	MG/L
TDS	26000	MG/L	NA	24000	MG/L	24000	MG/L	12000	MG/L	15000	MG/L

TITLE: HALCRATE

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC505XXH SC515XXH SC525XXH SC535XXH SC545XXH SC555XXH
UNKNOWN 09/30/91 06/28/89 UNKNOWN 04/09/90 05/09/91
01/27/92 01/28/92 01/28/92 01/28/92 01/28/92 01/28/92

*** VOLATILES ***

COMPOUND

METHYLENE CHLORIDE	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG
ACETONE	38U	UG/KG	110U	UG/KG	36U	UG/KG	58U	UG/KG	43U	UG/KG	110U	UG/KG
CARBON DISULFIDE	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG
1,1-DICHLOROETHENE	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG
2-BUTANONE	13U	UG/KG	21	UG/KG	4J	UG/KG	10J	UG/KG	6J	UG/KG	28	UG/KG
1,1,1-TRICHLOROETHANE	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG
CARBON TETRACHLORIDE	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG
TRICHLOROETHENE	6UJ	UG/KG	6UJ	UG/KG	6UJ	UG/KG	7UJ	UG/KG	7UJ	UG/KG	6UJ	UG/KG
1,1,2-TRICHLOROETHANE	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG
BENZENE	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG
4-METHYL-2-PENTANONE	13U	UG/KG	12U	UG/KG	12U	UG/KG	14U	UG/KG	13U	UG/KG	13U	UG/KG
TETRACHLOROETHENE	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG
TOLUENE	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG
CHLOROBENZENE	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG
ETHYLBENZENE	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG
XYLENE (total)	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG
TRICHLOROFLUOROMETHANE	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG
FREON 113	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG
ETHYL ETHER	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG
ETHYL ACETATE	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG

*** SEMIVOLATILES ***

COMPOUND

1,4-DICHLOROBENZENE	420U	UG/KG	410U	UG/KG	410U	UG/KG	450U	UG/KG	440U	UG/KG	420U	UG/KG
1,2-DICHLOROBENZENE	420U	UG/KG	410U	UG/KG	410U	UG/KG	450U	UG/KG	440U	UG/KG	420U	UG/KG
N-NITROSO-DI-N-PROPYLAMINE	420U	UG/KG	410U	UG/KG	410U	UG/KG	450U	UG/KG	440U	UG/KG	420U	UG/KG
1,2,4-TRICHLOROBENZENE	420U	UG/KG	410U	UG/KG	410U	UG/KG	450U	UG/KG	440U	UG/KG	420U	UG/KG
ACENAPHTHENE	420U	UG/KG	410U	UG/KG	410U	UG/KG	450U	UG/KG	440U	UG/KG	420U	UG/KG
2,4-DINITROTOLUENE	420U	UG/KG	410U	UG/KG	410U	UG/KG	450U	UG/KG	440U	UG/KG	420U	UG/KG
PYRENE	420U	UG/KG	410U	UG/KG	410U	UG/KG	450U	UG/KG	440U	UG/KG	420U	UG/KG
CYCLOHEXANONE	420U	UG/KG	410U	UG/KG	410U	UG/KG	450U	UG/KG	440U	UG/KG	420U	UG/KG
PYRIDINE	420U	UG/KG	410U	UG/KG	410U	UG/KG	450U	UG/KG	440U	UG/KG	420U	UG/KG
2-NITROPROPANE	420U	UG/KG	410U	UG/KG	410U	UG/KG	450U	UG/KG	440U	UG/KG	420U	UG/KG

TITLE: HALCRATE

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC505XXH UNKNOWN 01/27/92	SC515XXH 09/30/91 01/28/92	SC525XXH 06/28/89 01/28/92	SC535XXH UNKNOWN 01/28/92	SC545XXH 04/09/90 01/28/92	SC555XXH 05/09/91 01/28/92
---------------------------------	----------------------------------	----------------------------------	---------------------------------	----------------------------------	----------------------------------

*** ALCOHOLS ***

COMPOUND

2-ETHOXYETHANOL	<500 MG/KG										
ISOBUTANOL	<10 MG/KG										
METHANOL	<10 MG/KG										
N-BUTYL ALCOHOL	<10 MG/KG										

*** INORGANICS ***

ANALYTE

ALUMINUM	7420 MG/KG	11000 MG/KG	7000J MG/KG	6330 MG/KG	8030 MG/KG	11700 MG/KG
ARSENIC	7.7U MG/KG	7.4U MG/KG	7.4U MG/KG	8.1U MG/KG	9.9 MG/KG	7.7U MG/KG
BARIUM	153 MG/KG	246 MG/KG	137J MG/KG	144J MG/KG	174J MG/KG	276J MG/KG
CADMUM	3.8J MG/KG	4.1J MG/KG	3.3J MG/KG	5.5J MG/KG	4.4J MG/KG	1.5J MG/KG
CALCIUM	161000J MG/KG	247000J MG/KG	160000J MG/KG	126000J MG/KG	177000J MG/KG	278000J MG/KG
CHROMIUM	34.4J MG/KG	50.7J MG/KG	34.0J MG/KG	86.3J MG/KG	53.5J MG/KG	54.9J MG/KG
IRON	7570J MG/KG	9700J MG/KG	7230J MG/KG	6830J MG/KG	8100J MG/KG	12500J MG/KG
LEAD	3.6U MG/KG	3.6U MG/KG	2.5U MG/KG	6.2U MG/KG	9.9U MG/KG	5.6U MG/KG
MAGNESIUM	2060J MG/KG	5250J MG/KG	1860J MG/KG	1760J MG/KG	3120J MG/KG	7850J MG/KG
MERCURY	0.1 MG/KG					
NICKEL	23.1 MG/KG	37.7 MG/KG	25.7 MG/KG	30.0 MG/KG	27.3 MG/KG	30.5 MG/KG
POTASSIUM	164000J MG/KG	53700J MG/KG	106000J MG/KG	137000J MG/KG	161000J MG/KG	38900J MG/KG
SELENIUM	10.2U MG/KG	9.9U MG/KG	9.9U MG/KG	10.8U MG/KG	10.7U MG/KG	10.2U MG/KG
SILVER	45.1 MG/KG	22.7J MG/KG	37.0J MG/KG	57.8J MG/KG	27.7J MG/KG	16.0 MG/KG
SODIUM	87000 MG/KG	67300 MG/KG	128000 MG/KG	133000 MG/KG	90700 MG/KG	67400 MG/KG
BORON	114J MG/KG	91.9J MG/KG	132J MG/KG	162J MG/KG	119J MG/KG	87.1J MG/KG

*** TCLP INORGANICS ***

ANALYTE

ALUMINUM	1020 UG/L	90.0U UG/L	238 UG/L	1090 UG/L	296 UG/L	90.0U UG/L
ARSENIC	99.0U UG/L	R UG/L	134U UG/L	149U UG/L	184U UG/L	103U UG/L
BARIUM	1210J UG/L	952J UG/L	1280J UG/L	1280J UG/L	1150J UG/L	1200J UG/L
CADMUM	5.0U UG/L	5.0U UG/L	5.0U UG/L	5.0U UG/L	5.0U UG/L	5.0U UG/L
CALCIUM	635000J UG/L	2640000 UG/L	1800000 UG/L	1130000 UG/L	863000 UG/L	3050000 UG/L
CHROMIUM	372 UG/L	147 UG/L	355 UG/L	852 UG/L	978 UG/L	165 UG/L
IRON	170U UG/L	38.0U UG/L	70.0U UG/L	137U UG/L	130U UG/L	23.0U UG/L
LEAD	20.0UJ UG/L	20.0U UG/L	20.0UJ UG/L	20.0UJ UG/L	23.0U UG/L	20.0UJ UG/L
MAGNESIUM	67.0U UG/L	155U UG/L	125U UG/L	105U UG/L	73.0U UG/L	148U UG/L
MERCURY	0.1U UG/L	0.1U UG/L	0.1U UG/L	0.1U UG/L	0.1U UG/L	0.1U UG/L
NICKEL	41.0 UG/L	199 UG/L	31.0 UG/L	99.0 UG/L	41.0 UG/L	75.0 UG/L
SELENIUM	80.0U UG/L	80.0U UG/L	80.0U UG/L	80.0U UG/L	80.0U UG/L	80.0U UG/L
SILVER	R UG/L	R UG/L	R UG/L	R UG/L	R UG/L	R UG/L
PH		12.2	12.1	11.9	11.8	12.1
						12.0

TITLE: HALCRATE

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC505XXH SC515XXH SC525XXH SC535XXH SC545XXH SC555XXH
UNKNOWN 09/30/91 06/28/89 UNKNOWN 01/28/92 04/09/90 05/09/91
01/27/92 01/28/92 01/28/92 01/28/92 01/28/92 01/28/92

*** MISCELLANEOUS ***

PARAMETER

CYANIDE-AMENABLE	-10	MG/KG	-17	MG/KG	-35	MG/KG	+16	MG/KG	+26	MG/KG	-34	MG/KG
CYANIDE-TOTAL	22	MG/KG	22	MG/KG	20	MG/KG	27	MG/KG	55	MG/KG	16	MG/KG
GROSS ALPHA	78+/-15	pCi/g	66+/-14	pCi/g	82+/-15	pCi/g	91+/-16	pCi/g	18+/-8	pCi/g	19+/-9	pCi/g
GROSS BETA	150+/-20	pCi/g	69+/-7	pCi/g	110+/-20	pCi/g	150+/-20	pCi/g	120+/-20	pCi/g	49+/-6	pCi/G
pH	13.3		12.8		13.1		13.2		13.3		12.7	
AMMONIA	<10	MG/KG	15	MG/KG	<10	MG/KG	<10	MG/KG	<10	MG/KG	<10	MG/KG
MOISTURE - GRAVIMETRIC	21.8	%	19.3	%	19.1	%	25.6	%	25.2	%	21.9	%
UNIT WEIGHT OF SHELBY TUBE	NA		NA		NA		NA		INT		NA	
TOC	3300	MG/KG	4500	MG/KG	4000	MG/KG	4900	MG/KG	4600	MG/KG	560	MG/KG
SWELL TEST	0	%	30	%	10	%	10	%	0	%	40	%
BULK DENSITY	1.92		1.89		1.94		1.85		1.88		1.77	
UNCONFINED COMPRESSIVE STRENG	NA		NA		NA		NA		NA		NA	
FLT CAKE-SPEC GRAV	2.40		2.24		2.88		2.72		2.57		2.52	
FLT CAKE-SPEC GRAV (SALT RINS)	2.26		2.28		2.07		2.26		2.42		2.26	
VISCOSITY	215	CP	175	CP	160	CP	230	CP	385	CP	205	CP
% WATER (KARL FISHER)	23.1	%	19.4	%	20.4	%	25.6	%	22.9	%	17.8	%
% SOLIDS (FILTERCAKE)	77.9	%	77.4	%	81.6	%	75.2	%	74.9	%	77.9	%
GRAIN SIZE - SIEVE 3/8 IN	NA		INT		NA		NA		100.0	%	INT	
GRAIN SIZE - SIEVE 3/4 IN	NA		INT		NA		NA		NA		INT	
GRAIN SIZE - SIEVE NO. 4	100.0	%	INT		100.0	%	100.0	%	96.3	%	INT	
GRAIN SIZE - SIEVE NO. 10	76.2	%	INT		66.3	%	96.8	%	64.7	%	INT	
GRAIN SIZE - SIEVE NO. 20	43.0	%	INT		37.5	%	61.9	%	36.2	%	INT	
GRAIN SIZE - SIEVE NO. 40	NA		INT		NA		NA		NA		INT	
GRAIN SIZE - SIEVE NO. 50	24.3	%	INT		18.0	%	34.0	%	20.2	%	INT	
GRAIN SIZE - SIEVE NO. 100	15.1	%	INT		10.1	%	17.0	%	10.7	%	INT	
GRAIN SIZE - SIEVE NO. 140	NA		INT		NA		NA		NA		INT	
GRAIN SIZE - SIEVE NO. 200	5.7	%	INT		4.3	%	9.1	%	4.7	%	INT	
PYCNOMETER FIL - SPEC. GRAV.	1.053		1.033		1.053		1.058		1.053		1.033	
PYCNOMETER FIL - SOLIDS DISS.	70000	MG/L	46000	MG/L	68000	MG/L	78000	MG/L	76000	MG/L	45000	MG/L
PYCNOMETER FIL - pH	12.9		12.5		12.9		12.8		12.7		12.3	
SALT RINSE FIL - SPEC. GRAV.	1.083		1.053		1.078		1.088		1.083		1.048	
SALT RINSE FIL - SOLIDS DISS.	110000	MG/L	73000	MG/L	99000	MG/L	120000	MG/L	120000	MG/L	69000	MG/L
SALT RINSE FIL - pH	13.0		12.5		13.0		12.0		12.8		12.4	

TITLE: HALCRATE

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC505XXH SC515XXH SC525XXH SC535XXH SC545XXH SC555XXH
UNKNOWN 09/30/91 06/28/89 UNKNOWN 04/09/90 05/09/91
01/27/92 01/28/92 01/28/92 01/28/92 01/28/92 01/28/92

*** ASTM LEACHATES ***

PARAMETER

CHLORIDE	1600	MG/L	2600	MG/L	1020	MG/L	1300	MG/L	2100	MG/L	690	MG/L
NITRATE	1400	MG/L	900	MG/L	2500	MG/L	1400	MG/L	900	MG/L	1800	MG/L
PERCENT RECOVERY OF SOLIDS	37.4	%	49.8	%	33.6	%	30.2	%	39.0	%	56.0	%
PHOSPHORUS	<0.01	MG/L										
SULFATE	2500	MG/L	1700	MG/L	2100	MG/L	3900	MG/L	2100	MG/L	1100	MG/L
TDS	25000	MG/L	15000	MG/L	27000	MG/L	26000	MG/L	25000	MG/L	13000	MG/L

TITLE: HALCRATE

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC565XXH
12/18/90
01/28/92

*** VOLATILES ***

COMPOUND

METHYLENE CHLORIDE	6U	UG/KG
ACETONE	100U	UG/KG
CARBON DISULFIDE	6U	UG/KG
1,1-DICHLOROETHENE	6U	UG/KG
2-BUTANONE	28	UG/KG
1,1,1-TRICHLOROETHANE	6U	UG/KG
CARBON TETRACHLORIDE	6U	UG/KG
TRICHLOROETHENE	6U	UG/KG
1,1,2-TRICHLOROETHANE	6U	UG/KG
BENZENE	6U	UG/KG
4-METHYL-2-PENTANONE	13U	UG/KG
TETRACHLOROETHENE	6U	UG/KG
TOLUENE	4J	UG/KG
CHLOROBENZENE	6U	UG/KG
ETHYLBENZENE	6U	UG/KG
XYLENE (total)	6U	UG/KG
TRICHLOROFUOROMETHANE	6U	UG/KG
FREON 113	6U	UG/KG
ETHYL ETHER	6U	UG/KG
ETHYL ACETATE	6U	UG/KG

*** SEMIVOLATILES ***

COMPOUND

1,4-DICHLOROBENZENE	420U	UG/KG
1,2-DICHLOROBENZENE	420U	UG/KG
N-NITROSO-DI-N-PROPYLAMINE	420U	UG/KG
1,2,4-TRICHLOROBENZENE	420U	UG/KG
ACENAPHTHENE	420U	UG/KG
2,4-DINITROTOLUENE	420U	UG/KG
PYRENE	420U	UG/KG
CYCLOHEXANONE	420U	UG/KG
PYRIDINE	420U	UG/KG
2-NITROPROPANE	420U	UG/KG

TITLE: HALCRATE

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC565XXH
12/18/90
01/28/92

*** ALCOHOLS ***

COMPOUND

2-ETHOXYETHANOL	<500	MG/KG
ISOBUTANOL	<10	MG/KG
METHANOL	<10	MG/KG
N-BUTYL ALCOHOL	<10	MG/KG

*** INORGANICS ***

ANALYTE

ALUMINUM	11800J	MG/KG
ARSENIC	7.7U	MG/KG
BARIUM	267J	MG/KG
CADMIUM	3.9J	MG/KG
CALCIUM	278000	MG/KG
CHROMIUM	50.5J	MG/KG
IRON	11700J	MG/KG
LEAD	3.2U	MG/KG
MAGNESIUM	6100J	MG/KG
MERCURY	0.1	MG/KG
NICKEL	42.1	MG/KG
POTASSIUM	73400J	MG/KG
SELENIUM	10.3U	MG/KG
SILVER	16.6	MG/KG
SODIUM	67200	MG/KG
BORON	128J	MG/KG

*** TCLP INORGANICS ***

ANALYTE

ALUMINUM	95.0	UG/L
ARSENIC	80.0U	UG/L
BARIUM	840J	UG/L
CADMIUM	5.0U	UG/L
CALCIUM	2500000	UG/L
CHROMIUM	271	UG/L
IRON	20.0U	UG/L
LEAD	24.0U	UG/L
MAGNESIUM	110U	UG/L
MERCURY	0.1U	UG/L
NICKEL	104	UG/L
SELENIUM	80.0U	UG/L
SILVER	R	UG/L
pH	12.0	

TITLE: HALCRATE

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC565XXH
12/18/90
01/28/92

*** MISCELLANEOUS ***

PARAMETER

CYANIDE-AMENABLE	-33	MG/KG
CYANIDE-TOTAL	22	MG/KG
GROSS ALPHA	<9	pCi/g
GROSS BETA	77+/-8	pCi/g
pH	13.0	
AMMONIA	20	MG/KG
MOISTURE - GRAVIMETRIC	22.3	%
TOC	2000	MG/KG
SWELL TEST	70	%
BULK DENSITY	1.83	
UNCONFINED COMPRESSIVE STRENG	NA	
UNIT WEIGHT OF SHELBY TUBE	NA	
FLT CAKE-SPEC GRAV	2.59	
FLT CAKE-SPEC GRAV (SALT RINS)	2.36	
VISCOSITY	210	CP
% WATER (KARL FISHER)	19.8	%
% SOLIDS (FILTERCAKE)	77.0	%
GRAIN SIZE - SIEVE 3/8 IN	INT	
GRAIN SIZE - SIEVE 3/4 IN	INT	
GRAIN SIZE - SIEVE NO. 4	INT	
GRAIN SIZE - SIEVE NO. 10	INT	
GRAIN SIZE - SIEVE NO. 20	INT	
GRAIN SIZE - SIEVE NO. 40	INT	
GRAIN SIZE - SIEVE NO. 50	INT	
GRAIN SIZE - SIEVE NO. 100	INT	
GRAIN SIZE - SIEVE NO. 140	INT	
GRAIN SIZE - SIEVE NO. 200	INT	
PYCNOMETER FIL - SPEC. GRAV.	1.033	
PYCNOMETER FIL - SOLIDS DISS.	49000	MG/L
PYCNOMETER FIL - pH	12.6	
SALT RINSE FIL - SPEC. GRAV.	1.053	
SALT RINSE FIL - SOLIDS DISS.	71000	MG/L
SALT RINSE FIL - pH	12.7	

TITLE: HALCRATE

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC565XXH
12/18/90
01/28/92

*** ASTM LEACHATES ***

PARAMETER

CHLORIDE	920J	MG/L
NITRATE	970	MG/L
PERCENT RECOVERY OF SOLIDS	55.8	%
PHOSPHORUS	<0.01	MG/L
SULFATE	1400	MG/L
TDS	12000	MG/L

TITLE: METALS

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC01408M 07/28/88 01/07/92	SC41408M 01/06/87 01/21/92	SC41408MD 01/06/87 01/21/92	SC57408M 03/22/87 01/28/92 DUPLICATE	SC58408M 04/17/87 01/28/92	SC595XXM 07/29/89 01/30/92
----------------------------------	----------------------------------	-----------------------------------	---	----------------------------------	----------------------------------

*** VOLATILES ***

COMPOUND

	6U UG/KG	7U UG/KG					
METHYLENE CHLORIDE	64U UG/KG	40U UG/KG	37U UG/KG	31U UG/KG	47U UG/KG	38U UG/KG	
ACETONE	6U UG/KG	7U UG/KG					
CARBON DISULFIDE	6U UG/KG	7U UG/KG					
1,1-DICHLOROETHENE	6U UG/KG	7U UG/KG					
2-BUTANONE	13U UG/KG	5J UG/KG	5J UG/KG	12U UG/KG	12U UG/KG	14U UG/KG	
1,1,1-TRICHLOROETHANE	6U UG/KG	7U UG/KG					
CARBON TETRACHLORIDE	6U UG/KG	7U UG/KG					
TRICHLOROETHENE	6U UG/KG	6UJ UG/KG	6UJ UG/KG	6UJ UG/KG	6UJ UG/KG	7UJ UG/KG	
1,1,2-TRICHLOROETHANE	6U UG/KG	7U UG/KG					
BENZENE	6U UG/KG	7U UG/KG					
4-METHYL-2-PENTANONE	13U UG/KG	12U UG/KG	12U UG/KG	12U UG/KG	12U UG/KG	14U UG/KG	
TETRACHLOROETHENE	6U UG/KG	7U UG/KG					
TOLUENE	6U UG/KG	7 UG/KG	7 UG/KG	6U UG/KG	6U UG/KG	7U UG/KG	
CHLOROBENZENE	6U UG/KG	7U UG/KG					
ETHYLBENZENE	6U UG/KG	7U UG/KG					
XYLENE (total)	6U UG/KG	4J UG/KG	4J UG/KG	6U UG/KG	6U UG/KG	7U UG/KG	
TRICHLOROFLUOROMETHANE	6UJ UG/KG	6U UG/KG	6U UG/KG	6U UG/KG	6U UG/KG	7U UG/KG	
FREON 113	6U UG/KG	7U UG/KG					
ETHYL ETHER	6U UG/KG	7U UG/KG					
ETHYL ACETATE	6U UG/KG	7U UG/KG					
*** SEMIVOLATILES ***							

COMPOUND

	420U UG/KG	410U UG/KG	450U UG/KG				
1,4-DICHLOROBENZENE	420U UG/KG	410U UG/KG	410U UG/KG	410U UG/KG	410U UG/KG	450U UG/KG	
1,2-DICHLOROBENZENE	420U UG/KG	410U UG/KG	410U UG/KG	410U UG/KG	410U UG/KG	450U UG/KG	
N-NITROSO-DI-N-PROPYLAMINE	420U UG/KG	410U UG/KG	410U UG/KG	410U UG/KG	410U UG/KG	450U UG/KG	
1,2,4-TRICHLOROBENZENE	420U UG/KG	410U UG/KG	410U UG/KG	410U UG/KG	410U UG/KG	450U UG/KG	
ACENAPHTHENE	420U UG/KG	410U UG/KG	410U UG/KG	410U UG/KG	410U UG/KG	450U UG/KG	
2,4-DINITROTOLUENE	420U UG/KG	410U UG/KG	410U UG/KG	410U UG/KG	410U UG/KG	450U UG/KG	
PYRENE	420U UG/KG	410U UG/KG	410U UG/KG	410U UG/KG	410U UG/KG	450U UG/KG	
CYCLOHEXANONE	420U UG/KG	410U UG/KG	410U UG/KG	410U UG/KG	410U UG/KG	450U UG/KG	
PYRIDINE	420U UG/KG	410U UG/KG	410U UG/KG	410U UG/KG	410U UG/KG	450U UG/KG	
2-NITROPROPANE	420U UG/KG	410U UG/KG	410U UG/KG	410U UG/KG	410U UG/KG	450U UG/KG	

TITLE: METALS

SAMPLE ID NUMBER: SC01408M SC41408M SC41408MD SC57408M SC58408M SC595XXM
ACCUMULATION DATE: 07/28/88 01/06/87 01/06/87 03/22/87 04/17/87 07/29/89
DATE SAMPLED: 01/07/92 01/21/92 01/21/92 01/28/92 01/28/92 01/30/92
COMMENT: DUPLICATE

*** ALCOHOLS ***

COMPOUND

2-ETHOXYETHANOL <500 MG/KG **ISOBUTANOL** <500 MG/KG **METHANOL** <10 MG/KG **N-BUTYL ALCOHOL** <10 MG/KG

*** INORGANICS ***

ANALYTE

ALUMINUM	3220	MG/KG	3540J	MG/KG	3560J	MG/KG	7380	MG/KG	6720	MG/KG	8110J	MG/KG
ARSENIC	7.7U	MG/KG	10.3U	MG/KG	12.2U	MG/KG	7.4U	MG/KG	7.4U	MG/KG	8.2	MG/KG
BARIUM	70.3	MG/KG	75.4	MG/KG	77.2	MG/KG	102J	MG/KG	91.2J	MG/KG	114J	MG/KG
CADMIUM	5.0	MG/KG	4.9	MG/KG	4.7	MG/KG	0.62UJ	MG/KG	0.62UJ	MG/KG	2.6J	MG/KG
CALCIUM	74300	MG/KG	78900	MG/KG	79400	MG/KG	120000J	MG/KG	109000J	MG/KG	130000J	MG/KG
CHROMIUM	25.0	MG/KG	23.1J	MG/KG	22.6J	MG/KG	20.0J	MG/KG	20.6J	MG/KG	16.4J	MG/KG
IRON	3550	MG/KG	3790	MG/KG	3810	MG/KG	4870J	MG/KG	4500J	MG/KG	5260J	MG/KG
LEAD	2.6U	MG/KG	2.5UJ	MG/KG	2.5UJ	MG/KG	2.5U	MG/KG	3.7U	MG/KG	4.4U	MG/KG
MAGNESIUM	1960J	MG/KG	2120J	MG/KG	2120J	MG/KG	2090J	MG/KG	1910J	MG/KG	2260J	MG/KG
MERCURY	0.1U	MG/KG	0.1UJ	MG/KG	0.2J	MG/KG	0.1	MG/KG	0.1	MG/KG	0.1	MG/KG
NICKEL	80.0	MG/KG	74.1	MG/KG	73.3	MG/KG	18.6	MG/KG	15.8	MG/KG	19.1	MG/KG
POTASSIUM	146000	MG/KG	152000	MG/KG	150000	MG/KG	87600J	MG/KG	109000J	MG/KG	52100J	MG/KG
SELENIUM	10.3UJ	MG/KG	10U	MG/KG	10U	MG/KG	9.9U	MG/KG	9.9U	MG/KG	10.7U	MG/KG
SILVER	68.8	MG/KG	66.9	MG/KG	68.0	MG/KG	2.7	MG/KG	3.9	MG/KG	9.4	MG/KG
SODIUM	119000	MG/KG	118000	MG/KG	140000	MG/KG	141000J	MG/KG	156000	MG/KG	188000	MG/KG
BORON	157	MG/KG	148	MG/KG	153	MG/KG	676J	MG/KG	312J	MG/KG	1880J	MG/KG

*** TCLP INORGANICS ***

ANALYTE

ALUMINUM	90.0U	UG/L	598	UG/L	NA	221	UG/L	507	UG/L	1530	UG/L
ARSENIC	166	UG/L	124U	UG/L	NA	152U	UG/L	125U	UG/L	162U	UG/L
BARIUM	815	UG/L	960J	UG/L	NA	788J	UG/L	829J	UG/L	1030J	UG/L
CADMIUM	92.0J	UG/L	141	UG/L	NA	5.0U	UG/L	5.0U	UG/L	5.0U	UG/L
CALCIUM	2690000	UG/L	3290000	UG/L	NA	1360000	UG/L	1420000	UG/L	1300000	UG/L
CHROMIUM	42.0J	UG/L	59.0	UG/L	NA	100	UG/L	146	UG/L	92.0	UG/L
IRON	40.0U	UG/L	982J	UG/L	NA	24.0U	UG/L	39.0U	UG/L	97.1U	UG/L
LEAD	20.0UJ	UG/L	20.0UJ	UG/L	NA	20.0UJ	UG/L	29.0U	UG/L	20.0UJ	UG/L
MAGNESIUM	53200J	UG/L	62100J	UG/L	NA	918	UG/L	363	UG/L	96.0U	UG/L
MERCURY	0.1U	UG/L	0.1U	UG/L	NA	0.1U	UG/L	0.1U	UG/L	0.1U	UG/L
NICKEL	1800J	UG/L	2330J	UG/L	NA	55.0	UG/L	35.0	UG/L	30.0U	UG/L
SELENIUM	80.0	UG/L	80.0UJ	UG/L	NA	80.0U	UG/L	80.0U	UG/L	80.0U	UG/L
SILVER	105	UG/L	156J	UG/L	NA	R	UG/L	R	UG/L	R	UG/L
pH	7.4		6.4		NA	11.0		11.3		11.9	

TITLE: METALS

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC01408M SC41408M SC41408MD SC57408M SC58408M SC595XXM
07/28/88 01/06/87 01/06/87 03/22/87 04/17/87 07/29/89
01/07/92 01/21/92 01/21/92 01/28/92 01/28/92 01/30/92
DUPLICATE

*** MISCELLANEOUS ***

PARAMETER

CYANIDE-AMENABLE	-22	MG/KG	+9.9	MG/KG	+13	MG/KG	-21	MG/KG	-72	MG/KG	-25	MG/KG
CYANIDE-TOTAL	12	MG/KG	17	MG/KG	17	MG/KG	27	MG/KG	34	MG/KG	9.0	MG/KG
GROSS ALPHA	250+/-30	pCi/g	450+/-50	pCi/g	320+/-40	pCi/g	92+/-16	pCi/g	94+/-17	pCi/g	18+/-8	pCi/g
GROSS BETA	190+/-30	pCi/g	210+/-30	pCi/g	220+/-30	pCi/g	160+/-20	pCi/g	170+/-20	pCi/g	96+/-10	pCi/g
pH	12.8		13.1		13.1		13.3		13.1		13.0	
AMMONIA	<9.9	MG/KG	<10	MG/KG	<10	MG/KG	<10	MG/KG	16	MG/KG	180	MG/KG
MOISTURE - GRAVIMETRIC	22.5		19.6	%	19.9	%	19.2	%	18.9	%	25.5	%
TOC	9100	MG/KG	7400	MG/KG	7800	MG/KG	7000	MG/KG	4600	MG/KG	2300	MG/KG
SWELL TEST	0	%	0	%	NA		0	%	0	%	0	%
BULK DENSITY	1.83		0.61	G/CC	NA		0.82	G/CC	0.80	G/CC	0.68	G/CC
UNCONFINED COMPRESSIVE STRENG	NA		INT		NA		INT		INT		INT	
UNIT WEIGHT OF SHELBY TUBE	NA		INT	G/CC	NA		0.98	G/CC	1.08	G/CC	INT	
FLT CAKE-SPEC GRAV	2.55		2.68		NA		2.79		2.74		2.84	
FLT CAKE-SPEC GRAV (SALT RINS)	2.47		2.14		NA		2.56		2.45		2.52	
VISCOSITY	235		545	CP	NA		170	CP	345	CP	380	CP
% WATER (KARL FISHER)	23.4	%	19.4	%	NA		19.1	%	21.7	%	26.5	%
% SOLIDS (FILTERCAKE)	76.7	%	79.9	%	NA		81.1	%	80.9	%	74.6	%
GRAIN SIZE - SIEVE 3/8 IN	100.0	%	NA		NA		NA		NA		NA	
GRAIN SIZE - SIEVE 3/4 IN	NA		NA									
GRAIN SIZE - SIEVE NO. 4	97.4	%	100.0	%	NA				100.0	%	100.0	%
GRAIN SIZE - SIEVE NO. 10	83.5	%	99.0	%	NA		100.0	%	99.6	%	99.9	%
GRAIN SIZE - SIEVE NO. 20	64.9	%	81.5	%	NA		49.9	%	43.2	%	40.3	%
GRAIN SIZE - SIEVE NO. 40	NA		NA									
GRAIN SIZE - SIEVE NO. 50	28.4	%	49.8	%	NA		25.6	%	20.1	%	20.0	%
GRAIN SIZE - SIEVE NO. 100	16.6	%	22.2	%	NA		14.6	%	12.5	%	11.6	%
GRAIN SIZE - SIEVE NO. 140	NA		NA									
GRAIN SIZE - SIEVE NO. 200	5.2	%	7.3	%	NA		5.7	%	4.7	%	4.3	%
PYCNOMETER FIL - SPEC. GRAV.	1.075		1.068		NA		1,058		1.063		1.058	
PYCNOMETER FIL - SOLIDS DISS.	41000	MG/L	92000	MG/L	NA		86000	MG/L	89000	MG/L	81000	MG/L
PYCNOMETER FIL - pH	12.5		12.5		NA		12.7		12.7		12.8	
SALT RINSE FIL - SPEC. GRAV.	1.101		1.098		NA		1.088		1.088		1.083	
SALT RINSE FIL - SOLIDS DISS.	130000	MG/L	130000	MG/L	NA		130000	MG/L	130000	MG/L	120000	MG/L
SALT RINSE FIL - pH	12.8		12.6		NA		12.8		12.9		12.8	

TITLE: METALS

SAMPLE ID NUMBER:	SC01408M	SC41408M	SC41408MD	SC57408M	SC58408M	SC595XXM
ACCUMULATION DATE:	07/28/88	01/06/87	01/06/87	03/22/87	04/17/87	07/29/89
DATE SAMPLED:	01/07/92	01/21/92	01/21/92	01/28/92	01/28/92	01/30/92
COMMENT:	DUPLICATE					

*** ASTM LEACHATES ***

PARAMETER

CHLORIDE	1700	MG/L	2000	MG/L	NA	490	MG/L	440	MG/L	340	MG/L
NITRATE	1900	MG/L	2000	MG/L	NA	3000	MG/L	2800	MG/L	2700	MG/L
PERCENT RECOVERY OF SOLIDS	19.2	%	22.6	%	NA	28.6	%	29.5	%	31.0	%
PHOSPHORUS	<0.01	MG/L	<0.01	MG/L	NA	<0.01	MG/L	<0.01	MG/L	<0.01	MG/L
SULFATE	3600	MG/L	7200	MG/L	NA	2200	MG/L	1500	MG/L	800	MG/L
TDS	31000	MG/L	31000	MG/L	NA	28000	MG/L	28000	MG/L	24000	MG/L

TITLE: METALS

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC605XXM
07/12/89
01/30/92

*** VOLATILES ***

COMPOUND

METHYLENE CHLORIDE	7U	UG/KG
ACETONE	49U	UG/KG
CARBON DISULFIDE	7U	UG/KG
1,1-DICHLOROETHENE	7U	UG/KG
2-BUTANONE	5J	UG/KG
1,1,1-TRICHLOROETHANE	7U	UG/KG
CARBON TETRACHLORIDE	7U	UG/KG
TRICHLOROETHENE	7UJ	UG/KG
1,1,2-TRICHLOROETHANE	7U	UG/KG
BENZENE	7U	UG/KG
4-METHYL-2-PENTANONE	14U	UG/KG
TETRACHLOROETHENE	7U	UG/KG
TOLUENE	7U	UG/KG
CHLOROBENZENE	7U	UG/KG
ETHYLBENZENE	7U	UG/KG
XYLENE (total)	7U	UG/KG
TRICHLOROFLUOROMETHANE	7U	UG/KG
FREON 113	7U	UG/KG
ETHYL ETHER	7U	UG/KG
ETHYL ACETATE	7U	UG/KG

*** SEMIVOLATILES ***

COMPOUND

1,4-DICHLOROBENZENE	460U	UG/KG
1,2-DICHLOROBENZENE	460U	UG/KG
N-NITROSO-DI-N-PROPYLAMINE	460U	UG/KG
1,2,4-TRICHLOROBENZENE	460U	UG/KG
ACENAPHTHENE	460U	UG/KG
2,4-DINITROTOLUENE	460U	UG/KG
PYRENE	460U	UG/KG
CYCLOHEXANONE	460U	UG/KG
PYRIDINE	460U	UG/KG
2-NITROPROPANE	460U	UG/KG

TITLE: METALS

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC605XXM
07/12/89
01/30/92

*** ALCOHOLS ***

COMPOUND

2-ETHOXYETHANOL	<500	MG/KG
ISOBUTANOL	<10	MG/KG
METHANOL	<10	MG/KG
N-BUTYL ALCOHOL	<10	MG/KG

*** INORGANICS ***

ANALYTE

ALUMINUM	5640	MG/KG
ARSENIC	8.0U	MG/KG
BARIUM	80.2J	MG/KG
CADMIUM	2.4J	MG/KG
CALCIUM	90400J	MG/KG
CHROMIUM	14.2J	MG/KG
IRON	3800J	MG/KG
LEAD	5.9U	MG/KG
MAGNESIUM	1590J	MG/KG
MERCURY	0.1	MG/KG
NICKEL	14.0	MG/KG
POTASSIUM	57400J	MG/KG
SELENIUM	10.7U	MG/KG
SILVER	26.6J	MG/KG
SODIUM	207000J	MG/KG
BORON	1910J	MG/KG

*** TCLP INORGANICS ***

ANALYTE

ALUMINUM	2870	UG/L
ARSENIC	183U	UG/L
BARIUM	554J	UG/L
CADMIUM	5.0	UG/L
CALCIUM	30400	UG/L
CHROMIUM	71.0	UG/L
IRON	308	UG/L
LEAD	28.0U	UG/L
MAGNESIUM	171	UG/L
MERCURY	0.1U	UG/L
NICKEL	48.0	UG/L
SELENIUM	80.0U	UG/L
SILVER	R	UG/L
pH	11.9	

TITLE: METALS

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC605XXM
07/12/89
01/30/92

*** MISCELLANEOUS ***

PARAMETER

CYANIDE-AMENABLE	-30	MG/KG
CYANIDE-TOTAL	13	MG/KG
GROSS ALPHA	43+-11	pCi/g
GROSS BETA	120+-20	pCi/g
PH	13.0	
AMMONIA	24	MG/KG
MOISTURE - GRAVIMETRIC	27.9	%
TOC	3600	MG/KG
SWELL TEST	0	%
BULK DENSITY	0.71	G/CC
UNCONFINED COMPRESSIVE STRENG	INT	
UNIT WEIGHT OF SHELBY TUBE	0.97	G/CC
FLT CAKE-SPEC GRAV	3.22	
FLT CAKE-SPEC GRAV (SALT RINS)	2.69	
VISCOSITY	370	CP
% WATER (KARL FISHER)	31.2	%
% SOLIDS (FILTERCAKE)	71.9	%
GRAIN SIZE - SIEVE 3/8 IN	NA	
GRAIN SIZE - SIEVE 3/4 IN	NA	
GRAIN SIZE - SIEVE NO. 4	NA	
GRAIN SIZE - SIEVE NO. 10	100.0	%
GRAIN SIZE - SIEVE NO. 20	54.2	%
GRAIN SIZE - SIEVE NO. 40	NA	
GRAIN SIZE - SIEVE NO. 50	22.1	%
GRAIN SIZE - SIEVE NO. 100	10.5	%
GRAIN SIZE - SIEVE NO. 140	NA	
GRAIN SIZE - SIEVE NO. 200	3.6	%
PYCNOMETER FIL - SPEC. GRAV.	1.068	
PYCNOMETER FIL - SOLIDS DISS.	90000	MG/L
PYCNOMETER FIL - pH	12.7	
SALT RINSE FIL - SPEC. GRAV.	1.093	
SALT RINSE FIL - SOLIDS DISS.	130000	MG/L
SALT RINSE FIL - pH	12.8	

TITLE: METALS

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC605XXM
07/12/89
01/30/92

*** ASTM LEACHATES ***

PARAMETER

CHLORIDE	350	MG/L
NITRATE	2900	MG/L
PERCENT RECOVERY OF SOLIDS	23.6	%
PHOSPHORUS	<0.01	MG/L
SULFATE	1100	MG/L
TDS	29000	MG/L

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC02408T SC03408T SC03408TD SC04408T SC05410T SC06410T
05/17/88 05/22/88 05/22/88 05/17/88 05/19/88 06/23/88
01/13/92 01/13/92 01/13/92 01/13/92 01/13/92 01/13/92
DUPLICATE

*** VOLATILES ***

COMPOUND

METHYLENE CHLORIDE	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
ACETONE	26U	UG/KG	58U	UG/KG	260J	UG/KG	45U	UG/KG	54U	UG/KG	93U	UG/KG
CARBON DISULFIDE	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
1,1-DICHLOROETHENE	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
2-BUTANONE	13U	UG/KG	14UJ	UG/KG	15J	UG/KG	12U	UG/KG	12U	UG/KG	13U	UG/KG
1,1,1-TRICHLORETHANE	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
CARBON TETRACHLORIDE	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
TRICHLOROETHENE	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
1,1,2-TRICHLOROETHANE	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
BENZENE	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
4-METHYL-2-PENTANONE	13U	UG/KG	14U	UG/KG	14U	UG/KG	12U	UG/KG	12U	UG/KG	13U	UG/KG
TETRACHLOROETHENE	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
TOLUENE	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
CHLOROBENZENE	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
ETHYLBENZENE	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
XYLENE (total)	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
TRICHLOROFLUOROMETHANE	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
FREON 113	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
ETHYL ETHER	6U	UG/KG	7UJ	UG/KG	7UJ	UG/KG	6UJ	UG/KG	6UJ	UG/KG	6UJ	UG/KG
ETHYL ACETATE	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG

*** SEMIVOLATILES ***

COMPOUND

1,4-DICHLOROBENZENE	430U	UG/KG	460U	UG/KG	460U	UG/KG	410U	UG/KG	400U	UG/KG	420U	UG/KG
1,2-DICHLOROBENZENE	430U	UG/KG	460U	UG/KG	460U	UG/KG	410U	UG/KG	400U	UG/KG	420U	UG/KG
N-NITROSO-DI-N-PROPYLAMINE	430U	UG/KG	460U	UG/KG	460U	UG/KG	410U	UG/KG	400U	UG/KG	420U	UG/KG
1,2,4-TRICHLOROBENZENE	430U	UG/KG	460U	UG/KG	460U	UG/KG	410U	UG/KG	400U	UG/KG	420U	UG/KG
ACENAPHTHENE	430U	UG/KG	460U	UG/KG	460U	UG/KG	410U	UG/KG	400U	UG/KG	420U	UG/KG
2,4-DINITROTOLUENE	430U	UG/KG	460U	UG/KG	460U	UG/KG	410U	UG/KG	400U	UG/KG	420U	UG/KG
PYRENE	430U	UG/KG	460U	UG/KG	460U	UG/KG	410U	UG/KG	400U	UG/KG	420U	UG/KG
CYCLOHEXANONE	430U	UG/KG	460U	UG/KG	460U	UG/KG	410U	UG/KG	400U	UG/KG	420U	UG/KG
PYRIDINE	430U	UG/KG	460U	UG/KG	460U	UG/KG	410U	UG/KG	400U	UG/KG	420U	UG/KG
2-NITROPROPANE	430U	UG/KG	460U	UG/KG	460UJ	UG/KG	410U	UG/KG	400U	UG/KG	420U	UG/KG

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC02408T SC03408T SC03408TD SC04408T SC05410T SC06410T
05/17/88 05/22/88 05/22/88 05/17/88 05/19/88 06/23/88
01/13/92 01/13/92 01/13/92 DUPLICATE
01/13/92 01/13/92 01/13/92

*** ALCOHOLS ***

COMPOUND

2-ETHOXYETHANOL	<500	MG/KG										
ISOBUTANOL	<10	MG/KG										
METHANOL	<10	MG/KG										
N-BUTYL ALCOHOL	<10	MG/KG										

*** INORGANICS ***

ANALYTE

ALUMINUM	4980	MG/KG	6320	MG/KG	6330J	MG/KG	3750	MG/KG	6100	MG/KG	3720	MG/KG
ARSENIC	7.8U	MG/KG	12.8	MG/KG	8.3U	MG/KG	12.0	MG/KG	11.4	MG/KG	15.6	MG/KG
BARIUM	115	MG/KG	149	MG/KG	149	MG/KG	88.0	MG/KG	141	MG/KG	87.8	MG/KG
CADMIUM	1.3	MG/KG	1.2	MG/KG	1.5	MG/KG	2.3	MG/KG	2.5	MG/KG	2.8	MG/KG
CALCIUM	96100J	MG/KG	123000J	MG/KG	123000J	MG/KG	72100J	MG/KG	116000J	MG/KG	72300J	MG/KG
CHROMIUM	17.7	MG/KG	21.9	MG/KG	22.9	MG/KG	20.2	MG/KG	25.6	MG/KG	48.7	MG/KG
IRON	5170J	MG/KG	6590J	MG/KG	6600J	MG/KG	3920J	MG/KG	6210J	MG/KG	3900J	MG/KG
LEAD	2.6U	MG/KG	2.8U	MG/KG	2.8U	MG/KG	2.5U	MG/KG	2.4U	MG/KG	2.6U	MG/KG
MAGNESIUM	1250J	MG/KG	1770J	MG/KG	1770J	MG/KG	1020J	MG/KG	1630J	MG/KG	1310J	MG/KG
MERCURY	0.1U	MG/KG	0.1U	MG/KG	0.1U	MG/KG	0.1U	MG/KG	0.1U	MG/KG	0.1U	MG/KG
NICKEL	10.3	MG/KG	16.1	MG/KG	16.6	MG/KG	8.4	MG/KG	15.6	MG/KG	188	MG/KG
POTASSIUM	129000	MG/KG	105000	MG/KG	106000	MG/KG	137000	MG/KG	101000	MG/KG	129000	MG/KG
SELENIUM	10.4UJ	MG/KG	11.1UJ	MG/KG	11.0UJ	MG/KG	10.0UJ	MG/KG	9.6UJ	MG/KG	10.2UJ	MG/KG
SILVER	15.2U	MG/KG	22.1	MG/KG	21.8	MG/KG	29.6	MG/KG	32.3	MG/KG	28.3	MG/KG
SODIUM	112000	MG/KG	104000	MG/KG	105000	MG/KG	123000	MG/KG	119000J	MG/KG	132000	MG/KG
BORON	87.0J	MG/KG	82.1J	MG/KG	81.4J	MG/KG	95.6J	MG/KG	83.4J	MG/KG	113J	MG/KG

*** TCLP INORGANICS ***

ANALYTE

ALUMINUM	865	UG/L	631	UG/L	NA		369	UG/L	105	UG/L	370	UG/L
ARSENIC	114	UG/L	171	UG/L	NA		165	UG/L	147	UG/L	159	UG/L
BARIUM	583J	UG/L	256J	UG/L	NA		858J	UG/L	628J	UG/L	657J	UG/L
CADMIUM	5.0U	UG/L	5.0U	UG/L	NA		5.0U	UG/L	5.0U	UG/L	5.0U	UG/L
CALCIUM	1660000	UG/L	1930000	UG/L	NA		1360000	UG/L	1580000	UG/L	1290000	UG/L
CHROMIUM	272	UG/L	277	UG/L	NA		74.0	UG/L	376	UG/L	129	UG/L
IRON	73.0	UG/L	26.0U	UG/L	NA		42.0U	UG/L	38.0U	UG/L	33.0U	UG/L
LEAD	80.0U	UG/L	20.0U	UG/L	NA		20.0U	UG/L	20.0U	UG/L	80.0U	UG/L
MAGNESIUM	90.0U	UG/L	160	UG/L	NA		247	UG/L	97.0U	UG/L	219	UG/L
MERCURY	0.1U	UG/L	0.1U	UG/L	NA		0.1U	UG/L	0.1U	UG/L	0.1U	UG/L
NICKEL	30.0U	UG/L	30.0U	UG/L	NA		51.0	UG/L	30.0	UG/L	213	UG/L
SELENIUM	80.0U	UG/L	80.0U	UG/L	NA		80.0U	UG/L	80.0U	UG/L	80.0U	UG/L
SILVER	3.0U	UG/L	3.0UJ	UG/L	NA		3.0UJ	UG/L	3.0UJ	UG/L	3.0UJ	UG/L
pH			11.8		11.7	NA		11.4		12.1		11.4

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC02408T SC03408T SC03408TD SC04408T SC05410T SC06410T
05/17/88 05/22/88 05/22/88 05/17/88 05/19/88 06/23/88
01/13/92 01/13/92 01/13/92 01/13/92 01/13/92 01/13/92
DUPLICATE

*** MISCELLANEOUS ***

PARAMETER

CYANIDE-AMENABLE	-19	MG/KG	-11	MG/KG	-12	MG/KG	-13	MG/KG	-12	MG/KG	0.60	MG/KG
CYANIDE-TOTAL	3.7	MG/KG	4.2	MG/KG	3.3	MG/KG	7.2	MG/KG	5.0	MG/KG	9.7	MG/KG
GROSS ALPHA	35+/-7J	pCi/g	86+/-11J	pCi/g	120+/-20	pCi/g	71+/-10J	pCi/g	73+/-10J	pCi/g	57+/-8J	pCi/g
GROSS BETA	150+/-20	pCi/g	180+/-20	pCi/g	170+/-20	pCi/g	180+/-20	pCi/g	170+/-20	pCi/g	180+/-20	pCi/g
pH	13.2		13.0		13.0		13.2		13.1		13.1	
AMMONIA	<10	MG/KG	<10	MG/KG	<20	MG/KG	<10	MG/KG	<10	MG/KG	<10	MG/KG
MOISTURE - GRAVIMETRIC	23.0	%	27.9	%	27.6	%	20.3	%	16.7	%	21.6	%
TOC	2500	MG/KG	2700	MG/KG	2600	MG/KG	3800	MG/KG	3400	MG/KG	3400	MG/KG
SWELL TEST	10	%	0	%	NA		0	%	0	%	0	%
BULK DENSITY	1.88		0.71		NA		1.86		1.96		1.93	
UNCONFINED COMPRESSIVE STRENG	NA											
UNIT WEIGHT OF SHELBY TUBE	1.05	G/CC	1.16	G/CC	NA		1.25	G/CC	0.73	G/CC	1.21	G/CC
FLT CAKE-SPEC GRAV	2.38		2.94		NA		2.89		2.96		2.98	
FLT CAKE-SPEC GRAV (SALT RINS)	2.74		2.54		NA		2.32		2.37		2.37	
VISCOSITY	220	CP	1390	CP	NA		190	CP	60	CP	200	CP
% WATER (KARL FISHER)	22.7	%	23.1	%	NA		18.2	%	12.8	%	18.9	%
% SOLIDS (FILTERCAKE)	77.6	%	72.0	%	NA		79.3	%	83.2	%	78.1	%
GRAIN SIZE - SIEVE 3/8 IN	100.0	%	NA		NA		100.0	%	NA		100.0	%
GRAIN SIZE - SIEVE 3/4 IN	NA											
GRAIN SIZE - SIEVE NO. 4	98.9	%	100.0	%	NA		98.0	%	100.0	%	99.3	%
GRAIN SIZE - SIEVE NO. 10	70.3	%	99.7	%	NA		90.5	%	84.8	%	89.9	%
GRAIN SIZE - SIEVE NO. 20	39.7	%	57.1	%	NA		66.6	%	47.9	%	63.2	%
GRAIN SIZE - SIEVE NO. 40	NA											
GRAIN SIZE - SIEVE NO. 50	20.0	%	22.0	%	NA		38.7	%	28.8	%	35.7	%
GRAIN SIZE - SIEVE NO. 100	12.2	%	12.3	%	NA		22.8	%	18.2	%	21.8	%
GRAIN SIZE - SIEVE NO. 140	NA											
GRAIN SIZE - SIEVE NO. 200	4.1	%	6.6	%	NA		6.3	%	6.9	%	7.0	%
PYCNOMETER FIL - SPEC. GRAV.	1.067		1.053		NA		1.068		1.058		1.068	
PYCNOMETER FIL - SOLIDS DISS.	91000	MG/L	68000	MG/L	NA		85000	MG/L	80000	MG/L	110000	MG/L
PYCNOMETER FIL - pH	12.8		12.8		NA		12.8		12.8		12.8	
SALT RINSE FIL - SPEC. GRAV.	1.049		1.078		NA		1.098		1.088		1.103	
SALT RINSE FIL - SOLIDS DISS.	65000	MG/L	110000	MG/L	NA		140000	MG/L	260000	MG/L	190000	MG/L
SALT RINSE FIL - pH	12.7		12.9		NA		12.9		13.0		13.0	

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC02408T SC03408T SC03408TD SC04408T SC05410T SC06410T
05/17/88 05/22/88 05/22/88 05/17/88 05/19/88 06/23/88
01/13/92 01/13/92 01/13/92 01/13/92 01/13/92 01/13/92
DUPLICATE

*** ASTM LEACHATES ***

PARAMETER

CHLORIDE	890	MG/L	860	MG/L	NA	1000	MG/L	710	MG/L	1000	MG/L
NITRATE	2200	MG/L	1900	MG/L	NA	3200	MG/L	2000	MG/L	2500	MG/L
PERCENT RECOVERY OF SOLIDS	26.6	%	32.0	%	NA	21.0	%	35.4	%	21.0	%
PHOSPHORUS	<0.01	MG/L	0.01	MG/L	NA	<0.01	MG/L	0.01	MG/L	<0.01	MG/L
SULFATE	1400	MG/L	1900	MG/L	NA	1800	MG/L	4000	MG/L	3100	MG/L
TDS	27000J	MG/L	21000J	MG/L	NA	34000J	MG/L	26000J	MG/L	33000J	MG/L

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC07408T SC08408T SC09408T SC10408T SC11408T SC12408T
08/06/88 09/28/87 07/04/88 07/07/88 07/04/88 10/10/88
01/14/92 01/14/92 01/14/92 01/14/92 01/14/92 01/14/92

*** VOLATILES ***

COMPOUND

METHYLENE CHLORIDE	12	UG/KG	10	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	5J	UG/KG
ACETONE	65U	UG/KG	65U	UG/KG	62U	UG/KG	96U	UG/KG	54U	UG/KG	110U	UG/KG
CARBON DISULFIDE	6U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG
1,1-DICHLOROETHENE	6U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG
2-BUTANONE	13U	UG/KG	13U	UG/KG	12U	UG/KG	13U	UG/KG	13U	UG/KG	14U	UG/KG
1,1,1-TRICHLORETHANE	6U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG
CARBON TETRACHLORIDE	6U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG
TRICHLORETHENE	6U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG
1,1,2-TRICHLOROETHANE	6U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG
BENZENE	6U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG
4-METHYL-2-PENTANONE	13U	UG/KG	13U	UG/KG	12U	UG/KG	13U	UG/KG	13U	UG/KG	14U	UG/KG
TETRACHLOROETHENE	6U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG
TOLUENE	6U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG
CHLOROBENZENE	6U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG
ETHYLBENZENE	6U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG
XYLENE (total)	6U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG
TRICHLOROFLUOROMETHANE	6U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG
FREON 113	6U	UG/KG	7U	UG/KG	15U	UG/KG	16U	UG/KG	16U	UG/KG	19U	UG/KG
ETHYL ETHER	6UJ	UG/KG	7UJ	UG/KG	6UJ	UG/KG	6UJ	UG/KG	6UJ	UG/KG	7UJ	UG/KG
ETHYL ACETATE	6U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG

*** SEMIVOLATILES ***

COMPOUND

1,4-DICHLOROBENZENE	420U	UG/KG	430U	UG/KG	410U	UG/KG	420U	UG/KG	420U	UG/KG	460U	UG/KG
1,2-DICHLOROBENZENE	420U	UG/KG	430U	UG/KG	410U	UG/KG	420U	UG/KG	420U	UG/KG	460U	UG/KG
N-NITROSO-DI-N-PROPYLAMINE	420U	UG/KG	430U	UG/KG	410U	UG/KG	420U	UG/KG	420U	UG/KG	460U	UG/KG
1,2,4-TRICHLOROBENZENE	420U	UG/KG	430U	UG/KG	410U	UG/KG	420U	UG/KG	420U	UG/KG	460U	UG/KG
ACENAPHTHENE	420U	UG/KG	430U	UG/KG	410U	UG/KG	420U	UG/KG	420U	UG/KG	460U	UG/KG
2,4-DINITROTOLUENE	420U	UG/KG	430U	UG/KG	410U	UG/KG	420U	UG/KG	420U	UG/KG	460U	UG/KG
PYRENE	420U	UG/KG	430U	UG/KG	410U	UG/KG	420U	UG/KG	420U	UG/KG	460U	UG/KG
CYCLOHEXANONE	420U	UG/KG	430U	UG/KG	410U	UG/KG	420U	UG/KG	420U	UG/KG	460U	UG/KG
PYRIDINE	420U	UG/KG	430U	UG/KG	410U	UG/KG	420U	UG/KG	420U	UG/KG	460U	UG/KG
2-NITROPROPANE	420U	UG/KG	430UJ	UG/KG	410U	UG/KG	420UJ	UG/KG	420UJ	UG/KG	460UJ	UG/KG

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC07408T SC08408T SC09408T SC10408T SC11408T SC12408T
08/06/88 09/28/87 07/04/88 07/07/88 07/04/88 10/10/88
01/14/92 01/14/92 01/14/92 01/14/92 01/14/92 01/14/92

*** ALCOHOLS ***

COMPOUND

2-ETHOXYETHANOL	<500	MG/KG										
ISOBUTANOL	<10	MG/KG										
METHANOL	<10	MG/KG										
N-BUTYL ALCOHOL	<10	MG/KG										

*** INORGANICS ***

ANALYTE

ALUMINUM	4130	MG/KG	4980J	MG/KG	4590J	MG/KG	4050J	MG/KG	4070J	MG/KG	5050J	MG/KG
ARSENIC	19.4	MG/KG	10.9	MG/KG	15.9	MG/KG	10.8	MG/KG	12.2	MG/KG	10.7	MG/KG
BARIUM	102	MG/KG	109J	MG/KG	104J	MG/KG	91.8J	MG/KG	92.0J	MG/KG	134J	MG/KG
CADMIUM	3.5	MG/KG	2.4	MG/KG	2.0	MG/KG	3.9	MG/KG	2.7	MG/KG	3.2	MG/KG
CALCIUM	80200J	MG/KG	91300J	MG/KG	89300J	MG/KG	79100J	MG/KG	79100J	MG/KG	90100J	MG/KG
CHROMIUM	16.4	MG/KG	15.2	MG/KG	25.2	MG/KG	26.8	MG/KG	24.5	MG/KG	18.7	MG/KG
IRON	6270J	MG/KG	4960J	MG/KG	4680J	MG/KG	4170J	MG/KG	4160J	MG/KG	5240J	MG/KG
LEAD	14.5J	MG/KG	2.9J	MG/KG	2.5U	MG/KG	2.6U	MG/KG	2.6U	MG/KG	4.1J	MG/KG
MAGNESIUM	2500J	MG/KG	1050J	MG/KG	1840J	MG/KG	1740J	MG/KG	1660J	MG/KG	1530J	MG/KG
MERCURY	0.1U	MG/KG										
NICKEL	19.1	MG/KG	21.8	MG/KG	64.0	MG/KG	77.6	MG/KG	69.1	MG/KG	19.1	MG/KG
POTASSIUM	50200J	MG/KG	56300J	MG/KG	136000	MG/KG	140000	MG/KG	144000	MG/KG	168000	MG/KG
SELENIUM	10.3UJ	MG/KG	10.5UJ	MG/KG	9.9UJ	MG/KG	10.3UJ	MG/KG	10.3UJ	MG/KG	11.2UJ	MG/KG
SILVER	47.1	MG/KG	10.6U	MG/KG	20.4	MG/KG	25.4J	MG/KG	22.9	MG/KG	30.0J	MG/KG
SODIUM	160000	MG/KG	162000	MG/KG	123000	MG/KG	124000	MG/KG	128000	MG/KG	126000	MG/KG
BORON	56.6J	MG/KG	315J	MG/KG	91.8J	MG/KG	102J	MG/KG	105J	MG/KG	74.6J	MG/KG

*** TCLP INORGANICS ***

ANALYTE

ALUMINUM	90.0U	UG/L	1200	UG/L	633	UG/L	860	UG/L	514	UG/L	1440	UG/L
ARSENIC	191	UG/L	177	UG/L	196	UG/L	124	UG/L	214	UG/L	166	UG/L
BARIUM	590J	UG/L	767J	UG/L	818J	UG/L	814J	UG/L	705J	UG/L	678J	UG/L
CADMIUM	10U	UG/L	20.0U	UG/L	5.0U	UG/L	5.0U	UG/L	5.0U	UG/L	5.0U	UG/L
CALCIUM	1590000	UG/L	1190000	UG/L	1720000	UG/L	1530000	UG/L	1470000	UG/L	333000J	UG/L
CHROMIUM	183	UG/L	231	UG/L	90.0	UG/L	125	UG/L	89.0	UG/L	148	UG/L
IRON	38.0U	UG/L	107	UG/L	63.0	UG/L	48.0U	UG/L	27.0U	UG/L	121	UG/L
LEAD	80.0U	UG/L	20.0U	UG/L								
MAGNESIUM	7260J	UG/L	84.0U	UG/L	115U	UG/L	92.0U	UG/L	167	UG/L	61.0U	UG/L
MERCURY	0.1U	UG/L										
NICKEL	97.0	UG/L	83.0	UG/L	107	UG/L	117	UG/L	128	UG/L	65.0	UG/L
SELENIUM	80.0U	UG/L	80.0U	UG/L	80.0U	UG/L	80.0U	UG/L	80.0	UG/L	80.0U	UG/L
SILVER	3.0UJ	UG/L	3.0UJ	UG/L	3.0UJ	UG/L	3.0U	UG/L	3.0UJ	UG/L	3.0UJ	UG/L
pH	10.6		11.9		11.8		11.7		11.5		12.1	

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC07408T SC08408T SC09408T SC10408T SC11408T SC12408T
08/06/88 09/28/87 07/04/88 07/07/88 07/04/88 10/10/88
01/14/92 01/14/92 01/14/92 01/14/92 01/14/92 01/14/92

*** MISCELLANEOUS ***

PARAMETER

CYANIDE-AMENABLE	-2.0	MG/KG	-1.0	MG/KG	-16	MG/KG	-19	MG/KG	-28	MG/KG	-12	MG/KG
CYANIDE-TOTAL	14	MG/KG	7.7	MG/KG	8.5	MG/KG	10	MG/KG	8.8	MG/KG	7.7	MG/KG
GROSS ALPHA	88+/-10J	pCi/g	94+/-11J	pCi/g	60+/-10J	pCi/g	50+/-8J	pCi/g	45+/-8J	pCi/g	140+/-20J	pCi/g
GROSS BETA	140+/-20	pCi/g	170+/-20	pCi/g	160+/-20	pCi/g	160+/-20	pCi/g	160+/-20	pCi/g	180+/-20	pCi/g
pH	12.9		13.2		13.2		13.2		13.0		13.4	
AMMONIA	20	MG/KG	31	MG/KG	21	MG/KG	12	MG/KG	19	MG/KG	<10	MG/KG
MOISTURE - GRAVIMETRIC	22.1	%	23.7	%	19.5	%	22.4	%	22.4	%	28.7	%
TOC	5400	MG/KG	3100	MG/KG	3200	MG/KG	2600	MG/KG	3400	MG/KG	3000	MG/KG
SWELL TEST	0	%	0	%	0	%	0	%	0	%	0	%
BULK DENSITY	0.63	G/CC	0.68	G/CC	1.99		1.89		1.89		1.79	
UNCONFINED COMPRESSIVE STRENG.	NA		6	PSI								
UNIT WEIGHT OF SHELBY TUBE	0.91	G/CC	1.12	G/CC	1.18	G/CC	1.27	G/CC	1.31	G/CC	1.23	G/CC
FLT CAKE-SPEC GRAV	3.03		2.98		2.76		2.79		2.91		3.06	
FLT CAKE-SPEC GRAV (SALT RINS)	2.23		2.35		2.30		2.21		2.12		2.44	
VISCOSITY	170	CP	225	CP	135	CP	170	CP	170	CP	1300	CP
% WATER (KARL FISHER)	22.4	%	21.8	%	15.7	%	17.0	%	18.7	%	22.5	%
% SOLIDS (FILTERCAKE)	77.6	%	75.8	%	80.3	%	77.3	%	77.8	%	71.5	%
GRAIN SIZE - SIEVE 3/8 IN	NA		99.8	%	NA		100.0	%	100.0	%	100.0	%
GRAIN SIZE - SIEVE 3/4 IN	NA		100.0	%	NA		NA		NA		NA	
GRAIN SIZE - SIEVE NO. 4	100.0	%	97.8	%	100.0	%	98.9	%	98.1	%	94.4	%
GRAIN SIZE - SIEVE NO. 10	99.7	%	87.8	%	79.4	%	82.0	%	86.0	%	78.4	%
GRAIN SIZE - SIEVE NO. 20	87.8	%	55.4	%	47.1	%	58.2	%	61.8	%	62.6	%
GRAIN SIZE - SIEVE NO. 40	NA		NA									
GRAIN SIZE - SIEVE NO. 50	45.5	%	29.3	%	27.1	%	32.5	%	33.4	%	46.9	%
GRAIN SIZE - SIEVE NO. 100	25.0	%	15.3	%	18.3	%	21.7	%	20.9	%	34.1	%
GRAIN SIZE - SIEVE NO. 140	NA		NA									
GRAIN SIZE - SIEVE NO. 200	8.3	%	3.3	%	5.5	%	9.0	%	7.8	%	11.2	%
PYCNOMETER FIL - SPEC. GRAV.	1.063		1.063		1.063		1.068		1.068		1.063	
PYCNOMETER FIL - SOLIDS DISS.	87000	MG/L	83000	MG/L	85000	MG/L	97000	MG/L	91000	MG/L	96000	MG/L
PYCNOMETER FIL - pH	12.8		12.9		12.8		12.8		12.7		13.0	
SALT RINSE FIL - SPEC. GRAV.	1.098		1.093		1.048		1.098		1.098		1.098	
SALT RINSE FIL - SOLIDS DISS.	130000	MG/L	130000	MG/L	65000	MG/L	130000	MG/L	130000	MG/L	130000	MG/L
SALT RINSE FIL - pH	12.9		13.0		12.8		13.0		12.9		13.1	

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC07408T SC08408T SC09408T SC10408T SC11408T SC12408T
08/06/88 09/28/87 07/04/88 07/07/88 07/04/88 10/10/88
01/14/92 01/14/92 01/14/92 01/14/92 01/14/92 01/14/92

*** ASTM LEACHATES ***

PARAMETER

CHLORIDE	1200	MG/L	570	MG/L	460	MG/L	1100	MG/L	1100	MG/L	600	MG/L
NITRATE	2800	MG/L	2900	MG/L	2900	MG/L	3100	MG/L	3000	MG/L	2300	MG/L
PERCENT RECOVERY OF SOLIDS	25.0	%	25.6	%	26.8	%	20.8	%	21.4	%	26.2	%
PHOSPHORUS	<0.01	MG/L										
SULFATE	2400	MG/L	1400	MG/L	2400	MG/L	2200	MG/L	2400	MG/L	1400	MG/L
TDS	26000J	MG/L	27000J	MG/L	28000J	MG/L	30000J	MG/L	30000J	MG/L	26000J	MG/L

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC13408T SC14408T SC15408T SC16408T SC17408T SC185XXT
05/13/88 06/20/88 08/17/88 04/10/87 04/10/87 10/13-86
01/14/92 01/14/92 01/15/92 01/15/92 01/15/92 01/15/92

*** VOLATILES ***

COMPOUND

METHYLENE CHLORIDE	4J	UG/KG	5J	UG/KG	6U	UG/KG	5J	UG/KG	6U	UG/KG	6U	UG/KG
ACETONE	110U	UG/KG	150U	UG/KG	100U	UG/KG	120U	UG/KG	18U	UG/KG	33U	UG/KG
CARBON DISULFIDE	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
1,1-DICHLOROETHENE	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
2-BUTANONE	13	UG/KG	13U	UG/KG	14J	UG/KG	18J	UG/KG	12U	UG/KG	13U	UG/KG
1,1,1-TRICHLORETHANE	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
CARBON TETRACHLORIDE	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
TRICHLORETHENE	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
1,1,2-TRICHLOROETHANE	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
BENZENE	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
4-METHYL-2-PENTANONE	12U	UG/KG	13U	UG/KG	13U	UG/KG	12U	UG/KG	12U	UG/KG	13U	UG/KG
TETRACHLOROETHENE	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
TOLUENE	10	UG/KG	6U	UG/KG	6U	UG/KG	4J	UG/KG	6U	UG/KG	13	UG/KG
CHLOROBENZENE	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
ETHYLBENZENE	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
XYLENE (total)	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
TRICHLOROFLUOROMETHANE	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
FREON 113	15U	UG/KG	16U	UG/KG	8U	UG/KG	16U	UG/KG	6U	UG/KG	6U	UG/KG
ETHYL ETHER	6UJ	UG/KG	6UJ	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
ETHYL ACETATE	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG

*** SEMIVOLATILES ***

COMPOUND

1,4-DICHLOROBENZENE	410U	UG/KG	420U	UG/KG	420U	UG/KG	400U	UG/KG	410U	UG/KG	430U	UG/KG
1,2-DICHLOROBENZENE	410U	UG/KG	420U	UG/KG	420U	UG/KG	400U	UG/KG	410U	UG/KG	430U	UG/KG
N-NITROSO-DI-N-PROPYLAMINE	410U	UG/KG	420U	UG/KG	420U	UG/KG	400U	UG/KG	410U	UG/KG	430U	UG/KG
1,2,4-TRICHLOROBENZENE	410U	UG/KG	420U	UG/KG	420U	UG/KG	400U	UG/KG	410U	UG/KG	430U	UG/KG
ACENAPHTHENE	410U	UG/KG	420U	UG/KG	420U	UG/KG	400U	UG/KG	410U	UG/KG	430U	UG/KG
2,4-DINITROTOLUENE	410U	UG/KG	420U	UG/KG	420U	UG/KG	400U	UG/KG	410U	UG/KG	430U	UG/KG
PYRENE	410U	UG/KG	420U	UG/KG	420U	UG/KG	400U	UG/KG	410U	UG/KG	430U	UG/KG
CYCLOHEXANONE	410U	UG/KG	420U	UG/KG	420U	UG/KG	400U	UG/KG	410U	UG/KG	430U	UG/KG
PYRIDINE	410U	UG/KG	420U	UG/KG	420U	UG/KG	400U	UG/KG	410U	UG/KG	430U	UG/KG
2-NITROPROPANE	410U	UG/KG	420U	UG/KG	420U	UG/KG	400U	UG/KG	410U	UG/KG	430U	UG/KG

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE
DATE SAMPLED:
COMMENT:

SC13408T **SC14408T** **SC15408T** **SC16408T** **SC17408T** **SC185XXT**
05/13/88 06/20/88 08/17/88 04/10/87 04/10/87 10/13-86
01/14/92 01/14/92 01/15/92 01/15/92 01/15/92 01/15/92

*** ALCOHOLS ***

COMPOUND

2-ETHOXYETHANOL <500 MG/KG **ISOBUTANOL** <10 MG/KG **METHANOL** <10 MG/KG **N-BUTYL ALCOHOL** <10 MG/KG

*** INORGANICS ***

ANALYTE

ALUMINUM	3950	MG/KG	4840J	MG/KG	13500J	MG/KG	21400J	MG/KG	28600J	MG/KG	19500J	MG/KG
ARSENIC	9.0	MG/KG	13.1	MG/KG	37.0U	MG/KG	33.0U	MG/KG	31.1U	MG/KG	34.5U	MG/KG
BARIUM	84.8J	MG/KG	102J	MG/KG	302J	MG/KG	464J	MG/KG	378J	MG/KG	277J	MG/KG
CADMIUM	2.6	MG/KG	3.1	MG/KG	12.8J	MG/KG	14.3J	MG/KG	2.6UJ	MG/KG	2.2U	MG/KG
CALCIUM	80600J	MG/KG	97400J	MG/KG	273000J	MG/KG	424000J	MG/KG	448000J	MG/KG	299000J	MG/KG
CHROMIUM	21.0	MG/KG	42.5	MG/KG	73.1	MG/KG	66.5	MG/KG	74.6	MG/KG	90.3	MG/KG
IRON	4040J	MG/KG	4860J	MG/KG	23800J	MG/KG	21100J	MG/KG	18500J	MG/KG	12000J	MG/KG
LEAD	2.5U	MG/KG	2.6U	MG/KG	41.6	MG/KG	11.0U	MG/KG	10.4U	MG/KG	13.3	MG/KG
MAGNESIUM	1150J	MG/KG	1590J	MG/KG	7440J	MG/KG	6810J	MG/KG	8100J	MG/KG	5640J	MG/KG
MERCURY	0.1U	MG/KG	0.1U	MG/KG	0.5U	MG/KG	0.5U	MG/KG	0.5U	MG/KG	0.4U	MG/KG
NICKEL	13.3	MG/KG	147	MG/KG	111	MG/KG	147	MG/KG	64.8	MG/KG	47.8	MG/KG
POTASSIUM	125000	MG/KG	130000	MG/KG	352000	MG/KG	468000	MG/KG	475000	MG/KG	344000	MG/KG
SELENIUM	10.1UJ	MG/KG	10.2UJ	MG/KG	36.5UJ	MG/KG	44.0UJ	MG/KG	41.5UJ	MG/KG	35.4UJ	MG/KG
SILVER	31.0	MG/KG	25.5	MG/KG	168J	MG/KG	153J	MG/KG	16.1J	MG/KG	17.3J	MG/KG
SODIUM	138000	MG/KG	137000	MG/KG	582000	MG/KG	627000	MG/KG	560000	MG/KG	571000	MG/KG
ZIRCONIUM	123J	MG/KG	124J	MG/KG	307J	MG/KG	374J	MG/KG	1210J	MG/KG	459J	MG/KG

*** TCI P INORGANICS ***

ANALYTE

ALUMINUM	494	UG/L	202	UG/L	1280	UG/L	90.0U	UG/L	90.0	UG/L	90.0U	UG/L
ARSENIC	210	UG/L	152	UG/L	247	UG/L	211	UG/L	184	UG/L	253	UG/L
BARIUM	626J	UG/L	635J	UG/L	1600	UG/L	1290	UG/L	1570	UG/L	1140	UG/L
CADMIUM	5.0U	UG/L	5.0U	UG/L	100	UG/L	20.0	UG/L	5.0U	UG/L	5.0U	UG/L
CALCIUM	1660000	UG/L	1380000	UG/L	2900000	UG/L	3350000	UG/L	2510000	UG/L	2050000	UG/L
CHROMIUM	88.0	UG/L	103	UG/L	86.0	UG/L	147	UG/L	139	UG/L	10.0U	UG/L
IRON	49.0U	UG/L	17.0U	UG/L	257	UG/L	25.0U	UG/L	20.0U	UG/L	22.0U	UG/L
LEAD	20.0U	UG/L	80.0U	UG/L	20.0U	UG/L	33.0	UG/L	20.0U	UG/L	20.0U	UG/L
MAGNESIUM	188	UG/L	333	UG/L	62700	UG/L	31700	UG/L	19800	UG/L	16700	UG/L
MERCURY	0.1U	UG/L										
NICKEL	64.0	UG/L	205	UG/L	975	UG/L	589	UG/L	132	UG/L	146	UG/L
SELENIUM	80.0U	UG/L										
SILVER	3.0UJ	UG/L	3.0UJ	UG/L	144	UG/L	5.0	UG/L	3.0U	UG/L	3.0	UG/L
pH	11.5		11.3		6.2		8.3		9.3		8.5	

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC13408T SC14408T SC15408T SC16408T SC17408T SC185XXT
05/13/88 06/20/88 08/17/88 04/10/87 04/10/87 10/13-86
01/14/92 01/14/92 01/15/92 01/15/92 01/15/92 01/15/92

*** MISCELLANEOUS ***

PARAMETER

CYANIDE-AMENABLE	-24	MG/KG	7.3	MG/KG	-8.2	MG/KG	-12	MG/KG	5.2	MG/KG	-57	MG/KG
CYANIDE-TOTAL	8.2	MG/KG	9.6	MG/KG	13J	MG/KG	9.2J	MG/KG	8.5	MG/KG	4.4J	MG/KG
GROSS ALPHA	71+/-10J	pCi/g	53+/-8J	pCi/g	98+/-11	pCi/g	68+/-9	pCi/g	110+/-20	pCi/g	170+/-20	pCi/g
GROSS BETA	140+/-20	pCi/g	190+/-20	pCi/g	150+/-20	pCi/g	150+/-20	pCi/g	160+/-20	pCi/g	390+/-40	pCi/g
pH	13.2		13.3		13.1		13.1		13.3		13.3	
AMMONIA	<10	MG/KG	18	MG/KG	<10	MG/KG	<10	MG/KG	<10	MG/KG	18	MG/KG
MOISTURE - GRAVIMETRIC	20.4	%	21.9	%	21.9	%	18.2	%	19.3J	%	22.6	%
TOC	2600	MG/KG	3500	MG/KG	7100	MG/KG	5100	MG/KG	4600	MG/KG	2900	MG/KG
SWELL TEST	0	%	0	%	0	%	0	%	0	%	0	%
BULK DENSITY	1.83		1.89		0.78	G/CC	0.81	G/CC	0.81	G/CC	1.83	
UNCONFINED COMPRESSIVE STRENG.	NA		20	PSI	NA		NA		NA		85	PSI
UNIT WEIGHT OF SHELBY TUBE	1.36	G/CC	1.26	G/CC	0.93	G/CC	0.85	G/CC	1.25	G/CC	1.34	G/CC
FLT CAKE-SPEC GRAV	2.86		2.93		2.90		2.48		2.49		2.52	
FLT CAKE-SPEC GRAV (SALT RINS)	2.09		NA		2.02		2.21		2.13		2.15	
VISCOSITY	165	CP	190	CP	195	CP	135	CP	170	CP	310	CP
% WATER (KARL FISHER)	18.3	%	19.2	%	19.7	%	15.7	%	15.9	%	21.2	%
% SOLIDS (FILTERCAKE)	79.1	%	78.0	%	77.9	%	81.9	%	80.1	%	75.7	%
GRAIN SIZE - SIEVE 3/8 IN	100.0	%	100.0	%	NA		NA		100.0	%	100.0	%
GRAIN SIZE - SIEVE 3/4 IN	NA											
GRAIN SIZE - SIEVE NO. 4	97.6	%	98.4	%	100.0	%	100.0	%	99.9	%	99.0	%
GRAIN SIZE - SIEVE NO. 10	87.2	%	89.3	%	91.5	%	94.0	%	90.7	%	90.2	%
GRAIN SIZE - SIEVE NO. 20	66.5	%	69.6	%	60.9	%	57.7	%	65.2	%	69.5	%
GRAIN SIZE - SIEVE NO. 40	NA											
GRAIN SIZE - SIEVE NO. 50	43.9	%	37.9	%	30.8	%	35.9	%	41.2	%	45.5	%
GRAIN SIZE - SIEVE NO. 100	24.9	%	21.3	%	17.4	%	24.7	%	26.5	%	31.7	%
GRAIN SIZE - SIEVE NO. 140	NA											
GRAIN SIZE - SIEVE NO. 200	7.5	%	5.2	%	5.6	%	11.3	%	9.6	%	11.7	%
PYCNOMETER FIL - SPEC. GRAV.	1.068		1.068		1.073		1.062		1.062		1.062	
PYCNOMETER FIL - SOLIDS DISS.	81000	MG/L	91000	MG/L	86000	MG/L	82000	MG/L	82000	MG/L	86000	MG/L
PYCNOMETER FIL - pH	12.8		12.8		12.8		12.5		12.8		12.8	
SALT RINSE FIL - SPEC. GRAV.	1.103		1.108		1.103		1.097		1.087		1.097	
SALT RINSE FIL - SOLIDS DISS.	130000	MG/L	140000	MG/L	124000	MG/L	130000	MG/L	130000	MG/L	130000	MG/L
SALT RINSE FIL - pH	12.9		13.0		12.9		12.7		12.9		12.9	

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC13408T SC14408T SC15408T SC16408T SC17408T SC185XXT
05/13/88 06/20/88 08/17/88 04/10/87 04/10/87 10/13-86
01/14/92 01/14/92 01/15/92 01/15/92 01/15/92 01/15/92

*** ASTM LEACHATES ***

PARAMETER

CHLORIDE	930	MG/L	1200	MG/L	1600	MG/L	1300	MG/L	450	MG/L	490	MG/L
NITRATE	3500	MG/L	3200	MG/L	3200	MG/L	2900	MG/L	3100	MG/L	2900	MG/L
PERCENT RECOVERY OF SOLIDS	21.6	%	20.0	%	22.4	%	26.2	%	29.2	%	22.6	%
PHOSPHORUS	<0.01	MG/L	<0.01	MG/L	0.6J	MG/L	0.09J	MG/L	0.2J	MG/L	<0.01UJ	MG/L
SULFATE	4500	MG/L	2500	MG/L	3100	MG/L	3200	MG/L	1800	MG/L	1700	MG/L
TDS	29000J	MG/L	31000J	MG/L	32000	MG/L	28000	MG/L	31000	MG/L	28000	MG/L

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC195XXT SC205XXT SC215XXT SC225XXT SC23408T SC24408T
05/22/87 02/02/87 12/23/86 07/10/87 09/22/87 08/08/88
01/15/92 01/16/92 01/16/92 01/16/92 01/16/92 01/16/92

*** VOLATILES ***

COMPOUND

METHYLENE CHLORIDE	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
ACETONE	88U	UG/KG	68U	UG/KG	50U	UG/KG	24U	UG/KG	23U	UG/KG	20U	UG/KG
CARBON DISULFIDE	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
1,1-DICHLOROETHENE	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
2-BUTANONE	13U	UG/KG	47J	UG/KG	5J	UG/KG	13U	UG/KG	13U	UG/KG	12U	UG/KG
1,1,1-TRICHLORETHANE	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
CARBON TETRACHLORIDE	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
TRICHLORETHENE	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
1,1,2-TRICHLOROETHANE	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
BENZENE	5J	UG/KG	28	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
4-METHYL-2-PENTANONE	13U	UG/KG	13J	UG/KG	14U	UG/KG	13U	UG/KG	13U	UG/KG	12U	UG/KG
TETRACHLOROETHENE	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
TOLUENE	16	UG/KG	41	UG/KG	5J	UG/KG	6U	UG/KG	6U	UG/KG	12	UG/KG
CHLOROBENZENE	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
ETHYL BENZENE	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
XYLENE (total)	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
TRICHLOROFLUOROMETHANE	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
FREON 113	15U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
ETHYL ETHER	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG
ETHYL ACETATE	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG	6U	UG/KG

*** SEMIVOLATILES ***

COMPOUND

1,4-DICHLOROBENZENE	420U	UG/KG	430U	UG/KG	450U	UG/KG	430U	UG/KG	430U	UG/KG	390U	UG/KG
1,2-DICHLOROBENZENE	420U	UG/KG	430U	UG/KG	450U	UG/KG	430U	UG/KG	430U	UG/KG	390U	UG/KG
N-NITROSO-DI-N-PROPYLAMINE	420U	UG/KG	430U	UG/KG	450U	UG/KG	430U	UG/KG	430U	UG/KG	390U	UG/KG
1,2,4-TRICHLOROBENZENE	420U	UG/KG	430U	UG/KG	450U	UG/KG	430U	UG/KG	430U	UG/KG	390U	UG/KG
ACENAPHTHENE	420U	UG/KG	430U	UG/KG	450U	UG/KG	430U	UG/KG	430U	UG/KG	390U	UG/KG
2,4-DINITROTOLUENE	420U	UG/KG	430U	UG/KG	450U	UG/KG	430U	UG/KG	430U	UG/KG	390U	UG/KG
PYRENE	420U	UG/KG	430U	UG/KG	450U	UG/KG	430U	UG/KG	430U	UG/KG	390U	UG/KG
CYCLOHEXANONE	420U	UG/KG	430U	UG/KG	450U	UG/KG	430U	UG/KG	430U	UG/KG	390U	UG/KG
PYRIDINE	420U	UG/KG	430U	UG/KG	450U	UG/KG	430U	UG/KG	430U	UG/KG	390U	UG/KG
2-NITROPROPANE	420U	UG/KG	430U	UG/KG	450U	UG/KG	430U	UG/KG	430U	UG/KG	390U	UG/KG

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC195XXT **SC205XXT** **SC215XXT** **SC225XXT** **SC23408T** **SC24408T**
05/22/87 02/02/87 12/23/86 07/10/87 09/22/87 08/08/88
01/15/92 01/16/92 01/16/92 01/16/92 01/16/92 01/16/92

***** ALCOHOLS *****

COMPOUND

2-ETHOXYETHANOL <500 MG/KG **ISOBUTANOL** <10 MG/KG **METHANOL** <10 MG/KG **N-BUTYL ALCOHOL** <10 MG/KG

*** INORGANICS ***

ANALYTE

ALUMINUM	22500J	MG/KG	17800	MG/KG	18800	MG/KG	17900	MG/KG	11600	MG/KG	41500	MG/KG
ARSENIC	35.2U	MG/KG	25.0U	MG/KG	23.4U	MG/KG	42.3U	MG/KG	33.6U	MG/KG	84.6	MG/KG
BARIUM	310J	MG/KG	287	MG/KG	256J	MG/KG	238	MG/KG	236	MG/KG	868	MG/KG
CADMIUM	9.7J	MG/KG	5.8J	MG/KG	2.0UJ	MG/KG	6.4J	MG/KG	8.6J	MG/KG	14.1J	MG/KG
CALCIUM	353000J	MG/KG	270000	MG/KG	286000J	MG/KG	277000J	MG/KG	221000J	MG/KG	915000	MG/KG
CHROMIUM	73.1	MG/KG	80.4	MG/KG	80.9	MG/KG	70.1	MG/KG	52.6	MG/KG	190	MG/KG
IRON	14500J	MG/KG	12500J	MG/KG	12300J	MG/KG	11700J	MG/KG	12000J	MG/KG	41300	MG/KG
LEAD	9.3U	MG/KG	12.9	MG/KG	10.5	MG/KG	8.5U	MG/KG	8.6U	MG/KG	12.8U	MG/KG
MAGNESIUM	7070J	MG/KG	4950J	MG/KG	5630J	MG/KG	5370J	MG/KG	2720J	MG/KG	16300J	MG/KG
MERCURY	0.5U	MG/KG	0.4U	MG/KG	0.4U	MG/KG	0.4U	MG/KG	0.4U	MG/KG	0.6U	MG/KG
NICKEL	54.2	MG/KG	67.9	MG/KG	48.4	MG/KG	49.6	MG/KG	111	MG/KG	529	MG/KG
POTASSIUM	375000	MG/KG	475000	MG/KG	264000	MG/KG	170000J	MG/KG	190000	MG/KG	539000	MG/KG
SELENIUM	148UJ	MG/KG	33.3UJ	MG/KG	125UJ	MG/KG	34.2UJ	MG/KG	34.5UJ	MG/KG	51.3UJ	MG/KG
SILVER	103J	MG/KG	29.2J	MG/KG	20.3J	MG/KG	112J	MG/KG	82.8J	MG/KG	94.2J	MG/KG
SODIUM	545000	MG/KG	383000	MG/KG	470000	MG/KG	607000	MG/KG	647000	MG/KG	523000	MG/KG
BORON	1920J	MG/KG	7620	MG/KG	886J	MG/KG	4190	MG/KG	1500	MG/KG	462	MG/KG

*** TCIP INORGANICS ***

ANALYTE

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC195XXT 05/22/87 01/15/92	SC205XXT 02/02/87 01/16/92	SC215XXT 12/23/86 01/16/92	SC225XXT 07/10/87 01/16/92	SC23408T 09/22/87 01/16/92	SC24408T 08/08/88 01/16/92
----------------------------------	----------------------------------	----------------------------------	----------------------------------	----------------------------------	----------------------------------

*** MISCELLANEOUS ***

PARAMETER

CYANIDE-AMENABLE	-47	MG/KG	-45	MG/KG	-3.1	MG/KG	6.0	MG/KG	-1.9	MG/KG	-1.6	MG/KG
CYANIDE-TOTAL	14J	MG/KG	12J	MG/KG	3.2J	MG/KG	8.4J	MG/KG	8.0J	MG/KG	3.7J	MG/KG
GROSS ALPHA	300+/-30	pCi/g	400+/-40	pCi/g	230+/-30	pCi/g	560+/-60	pCi/g	290+/-30	pCi/g	750+/-80	pCi/g
GROSS BETA	220+/-30	pCi/g	300+/-30	pCi/g	380+/-40	pCi/g	240+/-30	pCi/g	260+/-30	pCi/g	150+/-20	pCi/g
pH	13.1		13.2		13.2		13.2		13.2		12.7	
AMMONIA	<10	MG/KG	51	MG/KG	12	MG/KG	13	MG/KG	51	MG/KG	<10	MG/KG
MOISTURE - GRAVIMETRIC	21.6	%	24.0	%	25.6	%	23.4	%	23.2	%	15.6	%
TOC	12000	MG/KG	4200	MG/KG	2900	MG/KG	3200	MG/KG	4700	MG/KG	270	MG/KG
SWELL TEST	0	%	0	%	10	%	0	%	0	%	20	%
BULK DENSITY	0.73	G/CC	1.91		1.84		0.64	G/CC	0.74	G/CC	1.94	
UNCONFINED COMPRESSIVE STRENG	NA											
UNIT WEIGHT OF SHELBY TUBE	1.05	G/CC	1.38	G/CC	1.09	G/CC	0.98	G/CC	1.15	G/CC	NA	NA
FLT CAKE-SPEC GRAV	2.43		2.56		2.52		2.54		2.58		2.09	
FLT CAKE-SPEC GRAV (SALT RINS)	2.32		2.68		2.22		2.43		2.21		1.89	
VISCOSITY	175	CP	860	CP	270	CP	270	CP	200	CP	145	CP
% WATER (KARL FISHER)	19.8	%	22.6	%	22.3	%	20.3	%	22.1	%	15.1	%
% SOLIDS (FILTERCAKE)	77.8	%	74.4	%	73.9	%	76.1	%	76.4	%	81.9	%
GRAIN SIZE - SIEVE 3/8 IN	100.0	%	100.0	%	100.0	%	99.9	%	100.0	%	100.0	%
GRAIN SIZE - SIEVE 3/4 IN	NA											
GRAIN SIZE - SIEVE NO. 4	99.6	%	99.7	%	99.7	%	99.8	%	99.7	%	99.6	%
GRAIN SIZE - SIEVE NO. 10	88.0	%	89.1	%	90.7	%	84.9	%	96.1	%	81.1	%
GRAIN SIZE - SIEVE NO. 20	47.5	%	66.8	%	43.0	%	59.2	%	68.4	%	50.0	%
GRAIN SIZE - SIEVE NO. 40	NA											
GRAIN SIZE - SIEVE NO. 50	26.2	%	44.2	%	23.7	%	34.4	%	34.8	%	29.0	%
GRAIN SIZE - SIEVE NO. 100	12.0	%	33.0	%	11.8	%	19.7	%	18.3	%	19.4	%
GRAIN SIZE - SIEVE NO. 140	NA											
GRAIN SIZE - SIEVE NO. 200	3.3	%	12.0	%	3.4	%	6.8	%	4.1	%	11.0	%
PYCNOMETER FIL - SPEC. GRAV.	1.062		1.062		1.062		1.062		1.067		1.042	
PYCNOMETER FIL - SOLIDS DISS.	86000	MG/L	86000	MG/L	81000	MG/L	88000	MG/L	91000	MG/L	60000	MG/L
PYCNOMETER FIL - pH	12.8		12.9		12.8		12.8		12.8		12.7	
SALT RINSE FIL - SPEC. GRAV.	1.092		1.097		1.052		1.097		1.107		1.072	
SALT RINSE FIL - SOLIDS DISS.	130000	MG/L	130000	MG/L	66000	MG/L	130000	MG/L	140000	MG/L	98000	MG/L
SALT RINSE FIL - pH	12.9		13.1		12.9		12.9		12.7		12.8	

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC195XXT SC205XXT SC215XXT SC225XXT SC23408T SC24408T
05/22/87 02/02/87 12/23/86 07/10/87 09/22/87 08/08/88
01/15/92 01/16/92 01/16/92 01/16/92 01/16/92 01/16/92

*** ASTM LEACHATES ***

PARAMETER

CHLORIDE	550	MG/L	970	MG/L	420	MG/L	320	MG/L	420	MG/L	590	MG/L
NITRATE	2800	MG/L	2700	MG/L	2800	MG/L	2800	MG/L	3700	MG/L	2400	MG/L
PERCENT RECOVERY OF SOLIDS	25.6	%	22.8	%	24.6	%	23.8	%	19.4	%	43.6	%
PHOSPHORUS	<0.01UJ	MG/L										
SULFATE	2500	MG/L	1600	MG/L	1700	MG/L	2100	MG/L	3800	MG/L	2000	MG/L
TDS	29000	MG/L	32000	MG/L	26000	MG/L	30000	MG/L	29000	MG/L	20000	MG/L

TITLE: TRIWALL

SAMPLE ID NUMBER:
 ACCUMULATION DATE:
 DATE SAMPLED:
 COMMENT:

SC25408T SC26408T SC275XXT SC285XXT SC29408T SC30408T
 12/28/86 10/29/87 07/10/87 06/25/89 08/05/88 04/06/87
 01/16/92 01/16/92 01/16/92 01/16/92 01/16/92 01/16/92

*** VOLATILES ***

COMPOUND

	7U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG
METHYLENE CHLORIDE	42U	UG/KG	23U	UG/KG	66U	UG/KG	34U	UG/KG	76U	UG/KG	48U	UG/KG
ACETONE	7U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG
CARBON DISULFIDE	7U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG
1,1-DICHLOROETHENE	7U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG
2-BUTANONE	14U	UG/KG	12U	UG/KG	14U	UG/KG	14U	UG/KG	12U	UG/KG	12U	UG/KG
1,1,1-TRICHLOROETHANE	7U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG
CARBON TETRACHLORIDE	7U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG
TRICHLORETHENE	7U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG
1,1,2-TRICHLOROETHANE	7U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG
BENZENE	7U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG
4-METHYL-2-PENTANONE	14U	UG/KG	12U	UG/KG	14UJ	UG/KG	14UJ	UG/KG	12UJ	UG/KG	12UJ	UG/KG
TETRACHLOROETHENE	7U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG
TOLUENE	7U	UG/KG	10	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG
CHLOROBENZENE	7U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG
ETHYLBENZENE	7U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG
XYLENE (total)	7U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG
TRICHLOROFLUOROMETHANE	7U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG
FREON 113	7U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG
ETHYL ETHER	7U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG
ETHYL ACETATE	7U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	6U	UG/KG

*** SEMIVOLATILES ***

COMPOUND

	450U	UG/KG	410U	UG/KG	450U	UG/KG	460U	UG/KG	410U	UG/KG	400U	UG/KG
1,4-DICHLOROBENZENE	450U	UG/KG	410U	UG/KG	450U	UG/KG	460U	UG/KG	410U	UG/KG	400U	UG/KG
1,2-DICHLOROBENZENE	450U	UG/KG	410U	UG/KG	450U	UG/KG	460U	UG/KG	410U	UG/KG	400U	UG/KG
N-NITROSO-DI-N-PROPYLAMINE	450U	UG/KG	410U	UG/KG	450U	UG/KG	460U	UG/KG	410U	UG/KG	400U	UG/KG
1,2,4-TRICHLOROBENZENE	450U	UG/KG	410U	UG/KG	450U	UG/KG	460U	UG/KG	410U	UG/KG	400U	UG/KG
ACENAPHTHENE	450U	UG/KG	410U	UG/KG	450U	UG/KG	460U	UG/KG	410U	UG/KG	400U	UG/KG
2,4-DINITROTOLUENE	450U	UG/KG	410U	UG/KG	450U	UG/KG	460U	UG/KG	410U	UG/KG	400U	UG/KG
PYRENE	450U	UG/KG	410U	UG/KG	450U	UG/KG	460U	UG/KG	410U	UG/KG	400U	UG/KG
CYCLOHEXANONE	450U	UG/KG	410U	UG/KG	450U	UG/KG	460U	UG/KG	410U	UG/KG	400U	UG/KG
PYRIDINE	450U	UG/KG	410U	UG/KG	450U	UG/KG	460U	UG/KG	410U	UG/KG	400U	UG/KG
2-NITROPROPANE	450U	UG/KG	410U	UG/KG	450U	UG/KG	460U	UG/KG	410U	UG/KG	400U	UG/KG

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC25408T 12/28/86 01/16/92 SC26408T 10/29/87 01/16/92 SC275XXT 07/10/87 01/16/92 SC285XXT 06/25/89 01/16/92 SC29408T 08/05/88 01/16/92 SC30408T 04/06/87 01/16/92

*** ALCOHOLS ***

COMPOUND

2-ETHOXYETHANOL	<500	MG/KG										
ISOBUTANOL	<10	MG/KG										
METHANOL	<10	MG/KG										
N-BUTYL ALCOHOL	<10	MG/KG										

*** INORGANICS ***

ANALYTE

ALUMINUM	16200	MG/KG	17100	MG/KG	16500	MG/KG	7240	MG/KG	19200	MG/KG	35400J	MG/KG
ARSENIC	32.1U	MG/KG	64.6	MG/KG	22.1U	MG/KG	35.8U	MG/KG	46.0U	MG/KG	35.5U	MG/KG
BARIUM	229	MG/KG	357	MG/KG	223	MG/KG	104	MG/KG	424	MG/KG	466J	MG/KG
CADMIUM	1.9UJ	MG/KG	17.7J	MG/KG	3.3U	MG/KG	9.0J	MG/KG	14.1J	MG/KG	3.0UJ	MG/KG
CALCIUM	253000	MG/KG	342000	MG/KG	258000J	MG/KG	114000J	MG/KG	381000	MG/KG	556000J	MG/KG
CHROMIUM	60.4	MG/KG	56.2	MG/KG	59.4	MG/KG	61.6	MG/KG	54.5	MG/KG	101	MG/KG
IRON	9980	MG/KG	17100	MG/KG	10800J	MG/KG	5880J	MG/KG	19100J	MG/KG	22900J	MG/KG
LEAD	7.5U	MG/KG	10.4U	MG/KG	7.7	MG/KG	7.2U	MG/KG	13.6	MG/KG	11.8U	MG/KG
MAGNESIUM	4500J	MG/KG	3600J	MG/KG	4850J	MG/KG	2640J	MG/KG	5910J	MG/KG	10000J	MG/KG
MERCURY	0.4U	MG/KG	0.5U	MG/KG	0.4U	MG/KG	0.4U	MG/KG	0.5U	MG/KG	0.6U	MG/KG
NICKEL	53.7	MG/KG	55.7	MG/KG	50.6	MG/KG	35.8	MG/KG	137	MG/KG	84.0	MG/KG
POTASSIUM	299000	MG/KG	346000	MG/KG	138000J	MG/KG	150000J	MG/KG	473000	MG/KG	518000	MG/KG
SELENIUM	29.9UJ	MG/KG	41.7UJ	MG/KG	29.5UJ	MG/KG	28.7UJ	MG/KG	40.4UJ	MG/KG	47.3UJ	MG/KG
SILVER	4.5J	MG/KG	64.1J	MG/KG	73.4J	MG/KG	150J	MG/KG	149J	MG/KG	18.9J	MG/KG
SODIUM	444000	MG/KG	659000	MG/KG	474000	MG/KG	566000	MG/KG	554000J	MG/KG	668000	MG/KG
BORON	3770	MG/KG	794	MG/KG	3850J	MG/KG	2640	MG/KG	346	MG/KG	1670J	MG/KG

*** TCLP INORGANICS ***

ANALYTE

ALUMINUM	90.0U	UG/L	90.0U	UG/L	90.0U	UG/L	36300	UG/L	90.0U	UG/L	90.0U	UG/L
ARSENIC	239	UG/L	218	UG/L	257	UG/L	238	UG/L	192	UG/L	138	UG/L
BARIUM	814	UG/L	1340	UG/L	764J	UG/L	1120	UG/L	864	UG/L	967	UG/L
CADMIUM	5.0U	UG/L	31.0	UG/L	10.0	UG/L	91.0	UG/L	12.0	UG/L	5.0U	UG/L
CALCIUM	1760000	UG/L	2350000	UG/L	2540000	UG/L	1500000	UG/L	3100000	UG/L	2220000	UG/L
CHROMIUM	80.0	UG/L	10.0U	UG/L	75.0	UG/L	357	UG/L	128	UG/L	118	UG/L
IRON	11.0U	UG/L	19.0U	UG/L	8.0U	UG/L	2550	UG/L	52.0U	UG/L	16.0U	UG/L
LEAD	20.0U	UG/L	20.0U	UG/L	22.0	UG/L	20.0U	UG/L	20.0U	UG/L	20.0U	UG/L
MAGNESIUM	9620	UG/L	8490	UG/L	24900	UG/L	29800	UG/L	21300	UG/L	2950	UG/L
MERCURY	0.1U	UG/L										
NICKEL	126	UG/L	215	UG/L	218	UG/L	389	UG/L	507	UG/L	68.0	UG/L
SELENIUM	80.0U	UG/L	80.0U	UG/L	80.0U	UG/L	80.0U	UG/L	95.0	UG/L	80.0U	UG/L
SILVER	3.0U	UG/L	20.0	UG/L	15.0	UG/L	129	UG/L	6.0	UG/L	4.0	UG/L
pH			9.4		9.1		8.3		5.5		9.1	

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC25408T SC26408T SC275XXT SC285XXT SC29408T SC30408T
12/28/86 10/29/87 07/10/87 06/25/89 08/05/88 04/06/87
01/16/92 01/16/92 01/16/92 01/16/92 01/16/92 01/16/92

*** MISCELLANEOUS ***

PARAMETER

CYANIDE-AMENABLE	4.4	MG/KG	-6.3	MG/KG	-0.70	MG/KG	-98	MG/KG	3.4	MG/KG	4.0	MG/KG
CYANIDE-TOTAL	7.4J	MG/KG	<0.25	MG/KG	5.7J	MG/KG	9.1J	MG/KG	6.7J	MG/KG	7.2J	MG/KG
GROSS ALPHA	160+/-20	pCi/g	130+/-20	pCi/g	290+/-30	pCi/g	590+/-60	pCi/g	140+/-20	pCi/g	170+/-20	pCi/g
GROSS BETA	190+/-20	pCi/g	140+/-20	pCi/g	180+/-20	pCi/g	300+/-30	pCi/g	180+/-20	pCi/g	180+/-20	pCi/g
pH	13.3		13.3		13.2		13.2		13.1		13.2	
AMMONIA	25	MG/KG	38	MG/KG	<10	MG/KG	47	MG/KG	<10	MG/KG	17	MG/KG
MOISTURE - GRAVIMETRIC	26.8	%	19.2	%	27.1	%	27.9	%	19.8	%	16.9	%
TOC	3400	MG/KG	1600	MG/KG	3600	MG/KG	6700	MG/KG	1900	MG/KG	3800	MG/KG
SWELL TEST	0	%	10	%	0	%	20	%	0	%	0	%
BULK DENSITY	1.82		1.89		0.72	G/CC	1.73		0.79	G/CC	1.99	
UNCONFINED COMPRESSIVE STRENG	NA		63	PSI	NA		NA		NA		NA	
UNIT WEIGHT OF SHELBY TUBE	1.24	G/CC	1.34	G/CC	0.95	G/CC	1.22	G/CC	1.07	G/CC	NA	
FLT CAKE-SPEC GRAV	2.38		2.44		1.90		2.84		2.37		2.45	
FLT CAKE-SPEC GRAV (SALT RINS)	2.46		2.27		2.14		2.60		2.19		2.61	
VISCOSITY	230	CP	235	CP	195	CP	280	CP	215	CP	110	CP
% WATER (KARL FISHER)	27.8	%	23.5	%	24.8	%	25.7	%	16.8	%	14.8	%
% SOLIDS (FILTERCAKE)	73.4	%	76.1	%	72.2	%	72.3	%	79.6	%	83.5	%
GRAIN SIZE - SIEVE 3/8 IN	100.0	%	100.0	%	100.0	%	100.0	%	NA		100.0	%
GRAIN SIZE - SIEVE 3/4 IN	NA											
GRAIN SIZE - SIEVE NO. 4	99.6	%	99.3	%	99.8	%	99.2	%	100.0	%	99.8	%
GRAIN SIZE - SIEVE NO. 10	92.2	%	91.2	%	79.9	%	90.0	%	90.1	%	90.2	%
GRAIN SIZE - SIEVE NO. 20	68.8	%	70.9	%	46.7	%	74.5	%	46.2	%	64.2	%
GRAIN SIZE - SIEVE NO. 40	NA											
GRAIN SIZE - SIEVE NO. 50	39.8	%	46.8	%	31.8	%	54.8	%	23.9	%	38.5	%
GRAIN SIZE - SIEVE NO. 100	26.0	%	34.0	%	19.8	%	36.8	%	15.7	%	27.4	%
GRAIN SIZE - SIEVE NO. 140	NA											
GRAIN SIZE - SIEVE NO. 200	11.1	%	17.8	%	8.5	%	19.8	%	7.8	%	14.6	%
PYCNOMETER FIL - SPEC. GRAV.	1.062		1.062		1.062		1.072		1.062		1.057	
PYCNOMETER FIL - SOLIDS DISS.	88000	MG/L	86000	MG/L	84000	MG/L	99000	MG/L	78000	MG/L	81000	MG/L
PYCNOMETER FIL - pH	12.8		12.6		12.8		12.7		12.6		12.9	
SALT RINSE FIL - SPEC. GRAV.	1.092		1.092		1.092		1.107		1.092		1.087	
SALT RINSE FIL - SOLIDS DISS.	130000	MG/L	130000	MG/L	130000	MG/L	150000	MG/L	120000	MG/L	120000	MG/L
SALT RINSE FIL - pH	12.9		12.8		12.8		12.9		12.8		13.0	

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC25408T SC26408T SC275XXT SC285XXT SC29408T SC30408T
12/28/86 10/29/87 07/10/87 06/25/89 08/05/88 04/06/87
01/16/92 01/16/92 01/16/92 01/16/92 01/16/92 01/16/92

*** ASTM LEACHATES ***

PARAMETER

CHLORIDE	410	MG/L	440	MG/L	410	MG/L	710	MG/L	1300	MG/L	480	MG/L
NITRATE	2400	MG/L	3300	MG/L	3900	MG/L	4100	MG/L	2300	MG/L	3000	MG/L
PERCENT RECOVERY OF SOLIDS	21.4	%	21.6	%	22.8	%	12.4	%	25.4	%	30.2	%
PHOSPHORUS	<0.01UJ	MG/L	<0.01UJ	MG/L	<0.01UJ	MG/L	0.04UJ	MG/L	<0.01UJ	MG/L	<0.01UJ	MG/L
SULFATE	760	MG/L	1400	MG/L	1600	MG/L	1100	MG/L	2600	MG/L	2100	MG/L
TDS	25000	MG/L	27000	MG/L	25000	MG/L	29000	MG/L	26000	MG/L	26000	MG/L

TITLE: TRIWALL

SAMPLE ID NUMBER:	SC31XXXT	SC325XXT	SC33XXXT	SC34XXXT	SC355XXT	SC36408T
ACCUMULATION DATE:	09/20/87	07/10/87	05/28/87	12/16/86	05/27/87	12/11/88
DATE SAMPLED:	01/20/92	01/29/92	01/20/92	01/20/92	01/20/92	01/20/92
COMMENT:						

*** VOLATILES ***

COMPOUND

METHYLENE CHLORIDE	7U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	7U	UG/KG
ACETONE	59U	UG/KG	78U	UG/KG	74U	UG/KG	51U	UG/KG	160J	UG/KG	170J	UG/KG
CARBON DISULFIDE	7U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	7U	UG/KG
1,1-DICHLOROETHENE	7U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	7U	UG/KG
2-BUTANONE	13UJ	UG/KG	13UJ	UG/KG	13UJ	UG/KG	14UJ	UG/KG	13UJ	UG/KG	13UJ	UG/KG
1,1,1-TRICHLOROETHANE	7U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	7U	UG/KG
CARBON TETRACHLORIDE	7U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	7U	UG/KG
TRICHLOROETHENE	7U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	7U	UG/KG
1,1,2-TRICHLOROETHANE	7U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	7U	UG/KG
BENZENE	7U	UG/KG	6U	UG/KG	5J	UG/KG	7U	UG/KG	5J	UG/KG	7U	UG/KG
4-METHYL-2-PENTANONE	22J	UG/KG	13UJ	UG/KG	13UJ	UG/KG	14UJ	UG/KG	13UJ	UG/KG	13U	UG/KG
TETRACHLOROETHENE	7U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	7U	UG/KG
TOLUENE	7U	UG/KG	6U	UG/KG	6U	UG/KG	35	UG/KG	20	UG/KG	7U	UG/KG
CHLOROBENZENE	7U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	7U	UG/KG
ETHYLBENZENE	7U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	7U	UG/KG
XYLENE (total)	7U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	7U	UG/KG
TRICHLOROFLUOROMETHANE	7U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	7U	UG/KG
FREON 113	7U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	7U	UG/KG
ETHYL ETHER	7U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	7U	UG/KG
ETHYL ACETATE	7U	UG/KG	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	7U	UG/KG
*** SEMIVOLATILES ***												

COMPOUND

1,4-DICHLOROBENZENE	430U	UG/KG	420U	UG/KG	420U	UG/KG	450U	UG/KG	430U	UG/KG	440U	UG/KG
1,2-DICHLOROBENZENE	430U	UG/KG	420U	UG/KG	420U	UG/KG	450U	UG/KG	430U	UG/KG	440U	UG/KG
N-NITROSO-DI-N-PROPYLAMINE	430U	UG/KG	420U	UG/KG	420U	UG/KG	450U	UG/KG	430U	UG/KG	440U	UG/KG
1,2,4-TRICHLOROBENZENE	430U	UG/KG	420U	UG/KG	420U	UG/KG	450U	UG/KG	430U	UG/KG	440U	UG/KG
ACENAPHTHENE	430U	UG/KG	420U	UG/KG	420U	UG/KG	450U	UG/KG	430U	UG/KG	440U	UG/KG
2,4-DINITROTOLUENE	430U	UG/KG	420U	UG/KG	420U	UG/KG	450U	UG/KG	430U	UG/KG	440U	UG/KG
PYRENE	430U	UG/KG	420U	UG/KG	420U	UG/KG	450U	UG/KG	430U	UG/KG	440U	UG/KG
CYCLOHEXANONE	430U	UG/KG	420U	UG/KG	420U	UG/KG	450U	UG/KG	430U	UG/KG	440U	UG/KG
PYRIDINE	430U	UG/KG	420U	UG/KG	420U	UG/KG	450U	UG/KG	430U	UG/KG	440U	UG/KG
2-NITROPROPANE	430U	UG/KG	420U	UG/KG	420U	UG/KG	450U	UG/KG	430U	UG/KG	440U	UG/KG

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC31XXXT 09/20/87 01/20/92 SC325XXT 07/10/87 01/29/92 SC33XXXT 05/28/87 01/20/92 SC34XXXT 12/16/86 01/20/92 SC355XXT 05/27/87 01/20/92 SC36408T 12/11/88 01/20/92

*** ALCOHOLS ***

COMPOUND

2-ETHOXYETHANOL	<500	MG/KG										
ISOBUTANOL	<10	MG/KG										
METHANOL	<10	MG/KG										
N-BUTYL ALCOHOL	<10	MG/KG										

*** INORGANICS ***

ANALYTE

ALUMINUM	4860J	MG/KG	6210J	MG/KG	5310J	MG/KG	5210J	MG/KG	4130J	MG/KG	5200J	MG/KG
ARSENIC	17.4U	MG/KG	8.9U	MG/KG	8.9U	MG/KG	8.9U	MG/KG	8.4U	MG/KG	12.6U	MG/KG
BARIUM	102	MG/KG	83.5	MG/KG	102	MG/KG	73.3	MG/KG	83.5	MG/KG	46.6	MG/KG
CADMIUM	1.2	MG/KG	1.9	MG/KG	3.4	MG/KG	0.68U	MG/KG	3.7	MG/KG	2.3	MG/KG
CALCIUM	95900	MG/KG	97200	MG/KG	89500J	MG/KG	81700	MG/KG	71700	MG/KG	108000	MG/KG
CHROMIUM	18.3J	MG/KG	24.8J	MG/KG	14.7J	MG/KG	17.6J	MG/KG	10.3J	MG/KG	24.8J	MG/KG
IRON	5190	MG/KG	4100J	MG/KG	4010J	MG/KG	3200	MG/KG	3840J	MG/KG	5170	MG/KG
LEAD	2.6UJ	MG/KG	2.6UJ	MG/KG	4.6U	MG/KG	2.7UJ	MG/KG	2.6UJ	MG/KG	2.7UJ	MG/KG
MAGNESIUM	1090J	MG/KG	1840J	MG/KG	1500J	MG/KG	1430J	MG/KG	1210J	MG/KG	3130J	MG/KG
MERCURY	0.1UJ	MG/KG										
NICKEL	36.1	MG/KG	19.5	MG/KG	16.9	MG/KG	15.7	MG/KG	12.4	MG/KG	36.4	MG/KG
POTASSIUM	49900	MG/KG	48600	MG/KG	114000	MG/KG	101000	MG/KG	117000	MG/KG	147000	MG/KG
SELENIUM	10.5U	MG/KG	10.3U	MG/KG	10.2U	MG/KG	10.9U	MG/KG	10.6U	MG/KG	10.7U	MG/KG
SILVER	22.7	MG/KG	35.1	MG/KG	28.7	MG/KG	0.55U	MG/KG	29.6	MG/KG	35.5	MG/KG
SODIUM	182000	MG/KG	191000	MG/KG	150000	MG/KG	173000	MG/KG	168000	MG/KG	114000	MG/KG
BORON	516	MG/KG	1150	MG/KG	554	MG/KG	962	MG/KG	591	MG/KG	105	MG/KG

*** TCLP INORGANICS ***

ANALYTE

ALUMINUM	90.0U	UG/L	90.0U	UG/L	90.0U	UG/L	90.0U	UG/L	263	UG/L	90.0U	UG/L
ARSENIC	189U	UG/L	279U	UG/L	176U	UG/L	195U	UG/L	191U	UG/L	71.0U	UG/L
BARIUM	655J	UG/L	688J	UG/L	893J	UG/L	736J	UG/L	1060J	UG/L	552J	UG/L
CADMIUM	16.0	UG/L	27.0	UG/L	21.0	UG/L	5.0U	UG/L	93.0	UG/L	5.0	UG/L
CALCIUM	2140000	UG/L	1810000	UG/L	2110000	UG/L	1420000	UG/L	2020000	UG/L	2090000	UG/L
CHROMIUM	176	UG/L	119	UG/L	70.0	UG/L	38.0	UG/L	18.0	UG/L	115	UG/L
IRON	17.0U	UG/L	26.0U	UG/L	32.0U	UG/L	23.0U	UG/L	122	UG/L	36.0U	UG/L
LEAD	20.0UJ	UG/L	20.0UJ	UG/L	20.0UJ	UG/L	34.0J	UG/L	20.0UJ	UG/L	80.0UJ	UG/L
MAGNESIUM	8190	UG/L	13200J	UG/L	16800J	UG/L	3120	UG/L	29100	UG/L	5390	UG/L
MERCURY	0.1U	UG/L										
NICKEL	367	UG/L	172	UG/L	205	UG/L	114	UG/L	309	UG/L	216	UG/L
SELENIUM	80.0UJ	UG/L										
SILVER	3.0UJ	UG/L	5.0J	UG/L	10.0J	UG/L	3.0UJ	UG/L	101J	UG/L	5.0J	UG/L
pH			8.9		9.4		8.5		10.1		6.5	

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC31XXXT 09/20/87 01/20/92	SC325XXT 07/10/87 01/29/92	SC33XXXT 05/28/87 01/20/92	SC34XXXT 12/16/86 01/20/92	SC355XXT 05/27/87 01/20/92	SC3640BT 12/11/88 01/20/92
----------------------------------	----------------------------------	----------------------------------	----------------------------------	----------------------------------	----------------------------------

*** MISCELLANEOUS ***

PARAMETER

CYANIDE-AMENABLE	1.3	MG/KG	-96	MG/KG	4.7	MG/KG	2.1	MG/KG	-9.3	MG/KG	+5.7	MG/KG
CYANIDE-TOTAL	9.1	MG/KG	9.0	MG/KG	12	MG/KG	5.2J	MG/KG	13	MG/KG	15	MG/KG
GROSS ALPHA	280+/-30	pCi/g	390+/-40	pCi/g	260+/-30	pCi/g	120+/-20	pCi/g	160+/-20	pCi/g	220+/-30	pCi/g
GROSS BETA	260+/-30	pCi/g	210+/-30	pCi/g	250+/-30	pCi/g	130+/-20	pCi/g	230+/-30	pCi/g	200+/-20	pCi/g
pH	12.7		12.9		13.0		13.0		13.1		13.1	
AMMONIA	19	MG/KG	<10	MG/KG	15	MG/KG	26	MG/KG	18	MG/KG	<10	MG/KG
MOISTURE - GRAVIMETRIC	24.1	%	22.2	%	21.7	%	26.9	%	24.2	%	25.1	%
TOC	5100	MG/KG	4800	MG/KG	5200	MG/KG	2600	MG/KG	4600	MG/KG	5200	MG/KG
SWELL TEST	0	%	0	%	0	%	20	%	0	%	0	%
BULK DENSITY	0.75	G/CC	0.63	G/CC	1.88		1.77		1.83		1.74	
UNCONFINED COMPRESSIVE STRENG	NA		61	PSI								
UNIT WEIGHT OF SHELBY TUBE	1.17	G/CC	0.99	G/CC	1.10	G/CC	1.12	G/CC	1.33	G/CC	1.32	G/CC
FLT CAKE-SPEC GRAV	2.61		2.69		2.66		2.67		2.90		2.61	
FLT CAKE-SPEC GRAV (SALT RINS)	2.29		2.23		2.24		2.27		2.20		2.21	
VISCOSITY	250	CP	220	CP	190	CP	935	CP	190	CP	330	CP
% WATER (KARL FISHER)	23.1	%	21.3	%	22.1	%	26.5	%	22.6	%	23.8	%
% SOLIDS (FILTERCAKE)	74.2	%	77.1	%	77.9	%	72.3	%	75.3	%	74.6	%
GRAIN SIZE - SIEVE 3/8 IN	100	%	100.0	%	100.0	%	100.0	%	100.0	%	100.0	%
GRAIN SIZE - SIEVE 3/4 IN	NA											
GRAIN SIZE - SIEVE NO. 40	NA											
GRAIN SIZE - SIEVE NO. 140	NA											
GRAIN SIZE - SIEVE NO. 4	99.9	%	99.5	%	99.5	%	99.9	%	99.9	%	99.8	%
GRAIN SIZE - SIEVE NO. 10	92.4	%	92.5	%	95.2	%	95.1	%	95.6	%	95.6	%
GRAIN SIZE - SIEVE NO. 20	54.5	%	63.6	%	67.1	%	69.3	%	64.1	%	60.8	%
GRAIN SIZE - SIEVE NO. 50	29.5	%	41.4	%	37.2	%	44.9	%	33.9	%	30.3	%
GRAIN SIZE - SIEVE NO. 100	19.6	%	25.9	%	23.0	%	25.4	%	19.4	%	17.1	%
GRAIN SIZE - SIEVE NO. 200	9.2	%	9.6	%	7.9	%	8.1	%	7.6	%	5.7	%
PYCNOMETER FIL - SPEC. GRAV.	1.063		1.063		1.068		1.068		1.068		1.063	
PYCNOMETER FIL - SOLIDS DISS.	89000	MG/L	87000	MG/L	91000	MG/L	94000	MG/L	97000	MG/L	83000	MG/L
PYCNOMETER FIL - pH	12.6		12.7		12.7		12.7		12.6		12.8	
SALT RINSE FIL - SPEC. GRAV.	NA		1.098		1.093		1.098		1.108		1.088	
SALT RINSE FIL - SOLIDS DISS.	NA		14000	MG/L	130000	MG/L	140000	MG/L	150000	MG/L	130000	MG/L
SALT RINSE FIL - pH	NA		12.7		12.8		12.8		12.6		12.9	

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC31XXXT SC325XXT SC33XXXT SC34XXXT SC355XXT SC36408T
09/20/87 07/10/87 05/28/87 12/16/86 05/27/87 12/11/88
01/20/92 01/29/92 01/20/92 01/20/92 01/20/92 01/20/92

*** ASTM LEACHATES ***

PARAMETER

CHLORIDE	490	MG/L	360	MG/L	820	MG/L	340	MG/L	740	MG/L	1000	MG/L
NITRATE	3100	MG/L	3000	MG/L	3200	MG/L	3400	MG/L	3500	MG/L	2400	MG/L
PERCENT RECOVERY OF SOLIDS	24.2	%	26.0	%	24.2	%	20.6	%	19.4	%	28.6	%
PHOSPHORUS	<0.01	MG/L	<0.01UJ	MG/L								
SULFATE	2000	MG/L	2800	MG/L	1700	MG/L	650	MG/L	1900	MG/L	2600	MG/L
TDS	26000	MG/L	27000	MG/L	27000	MG/L	26000	MG/L	29000	MG/L	25000	MG/L

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC37408T SC37408TD SC38408T SC39408T SC40408T SC424XXT
05/13/88 05/13/88 05/19/88 10/04/88 05/18/88 10/08/88
01/20/92 01/20/92 01/20/92 01/20/92 01/20/92 01/21/92
DUPLICATE

*** VOLATILES ***

COMPOUND

METHYLENE CHLORIDE
ACETONE
CARBON DISULFIDE
1,1-DICHLOROETHENE
2-BUTANONE
1,1,1-TRICHLOROETHANE
CARBON TETRACHLORIDE
TRICHLOROETHENE
1,1,2-TRICHLOROETHANE
BENZENE
4-METHYL-2-PENTANONE
TETRACHLOROETHENE
TOLUENE
CHLOROBENZENE
ETHYLBENZENE
XYLENE (total)
TRICHLOROFLUOROMETHANE
FREON 113
ETHYL ETHER
ETHYL ACETATE

	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG
ACETONE	130J	UG/KG	130J	UG/KG	92U	UG/KG	150J	UG/KG	73U	UG/KG	81U	UG/KG
CARBON DISULFIDE	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG
1,1-DICHLOROETHENE	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG
2-BUTANONE	13UJ	UG/KG	13UJ	UG/KG	5J	UG/KG	21J	UG/KG	4J	UG/KG	4J	UG/KG
1,1,1-TRICHLOROETHANE	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG
CARBON TETRACHLORIDE	6U	UG/KG	6U	UG/KG	7UJ	UG/KG	7UJ	UG/KG	6UJ	UG/KG	7UJ	UG/KG
TRICHLOROETHENE	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG
1,1,2-TRICHLOROETHANE	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG
BENZENE	6U	UG/KG	6U	UG/KG	7U	UG/KG	17	UG/KG	6U	UG/KG	7U	UG/KG
4-METHYL-2-PENTANONE	13UJ	UG/KG	13UJ	UG/KG	13U	UG/KG	14U	UG/KG	12U	UG/KG	14U	UG/KG
TETRACHLOROETHENE	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG
TOLUENE	6U	UG/KG	6U	UG/KG	7U	UG/KG	26	UG/KG	6U	UG/KG	7U	UG/KG
CHLOROBENZENE	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG
ETHYLBENZENE	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG
XYLENE (total)	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG
TRICHLOROFLUOROMETHANE	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG
FREON 113	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG
ETHYL ETHER	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG
ETHYL ACETATE	6U	UG/KG	6U	UG/KG	7U	UG/KG	7U	UG/KG	6U	UG/KG	7U	UG/KG

*** SEMIVOLATILES ***

COMPOUND

1,4-DICHLOROBENZENE
1,2-DICHLOROBENZENE
N-NITROSO-DI-N-PROPYLAMINE
1,2,4-TRICHLOROBENZENE
ACENAPHTHENE
2,4-DINITROTOLUENE
PYRENE
CYCLOHEXANONE
PYRIDINE
2-NITROPROPANE

	420U	UG/KG	420U	UG/KG	430U	UG/KG	460U	UG/KG	400U	UG/KG	450U	UG/KG
1,4-DICHLOROBENZENE	420U	UG/KG	420U	UG/KG	430U	UG/KG	460U	UG/KG	400U	UG/KG	450U	UG/KG
1,2-DICHLOROBENZENE	420U	UG/KG	420U	UG/KG	430U	UG/KG	460U	UG/KG	400U	UG/KG	450U	UG/KG
N-NITROSO-DI-N-PROPYLAMINE	420U	UG/KG	420U	UG/KG	430U	UG/KG	460U	UG/KG	400U	UG/KG	450U	UG/KG
1,2,4-TRICHLOROBENZENE	420U	UG/KG	420U	UG/KG	430U	UG/KG	460U	UG/KG	400U	UG/KG	450U	UG/KG
ACENAPHTHENE	420U	UG/KG	420U	UG/KG	430U	UG/KG	460U	UG/KG	400U	UG/KG	450U	UG/KG
2,4-DINITROTOLUENE	420U	UG/KG	420U	UG/KG	430U	UG/KG	460U	UG/KG	400U	UG/KG	450U	UG/KG
PYRENE	420U	UG/KG	420U	UG/KG	430U	UG/KG	460U	UG/KG	400U	UG/KG	450U	UG/KG
CYCLOHEXANONE	420U	UG/KG	420U	UG/KG	430U	UG/KG	460U	UG/KG	400U	UG/KG	450U	UG/KG
PYRIDINE	420U	UG/KG	420U	UG/KG	430U	UG/KG	460U	UG/KG	400U	UG/KG	450U	UG/KG
2-NITROPROPANE	420U	UG/KG	420U	UG/KG	430U	UG/KG	460U	UG/KG	400U	UG/KG	450U	UG/KG

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC37408T SC37408TD SC38408T SC39408T SC40408T SC424XXT
05/13/88 05/13/88 05/19/88 10/04/88 05/18/88 10/08/88
01/20/92 01/20/92 01/20/92 01/20/92 01/20/92 01/21/92
DUPLICATE

*** ALCOHOLS ***

COMPOUND

2-ETHOXYETHANOL	<500	MG/KG										
ISOBUTANOL	<10	MG/KG										
METHANOL	<10	MG/KG										
N-BUTYL ALCOHOL	<10	MG/KG										

*** INORGANICS ***

ANALYTE

ALUMINUM	3880J	MG/KG	3900J	MG/KG	7250J	MG/KG	3560J	MG/KG	3440J	MG/KG	4330J	MG/KG
ARSENIC	12.7U	MG/KG	16.8U	MG/KG	10.5U	MG/KG	8.4UJ	MG/KG	16.5U	MG/KG	143U	MG/KG
BARIUM	83.7	MG/KG	84.1	MG/KG	155	MG/KG	82.2	MG/KG	74.1	MG/KG	106	MG/KG
CADMIUM	2.3	MG/KG	2.4	MG/KG	1.3	MG/KG	4.2	MG/KG	1.8	MG/KG	3.1	MG/KG
CALCIUM	78900	MG/KG	79200	MG/KG	162000	MG/KG	71300J	MG/KG	70600	MG/KG	83600	MG/KG
CHROMIUM	21.0J	MG/KG	21.4J	MG/KG	23.2J	MG/KG	20.5J	MG/KG	18.0J	MG/KG	18.0J	MG/KG
IRON	3940	MG/KG	3960	MG/KG	7340J	MG/KG	4000J	MG/KG	3540	MG/KG	4560	MG/KG
LEAD	2.5UJ	MG/KG	10.2UJ	MG/KG	2.6UJ	MG/KG	2.8UJ	MG/KG	2.4UJ	MG/KG	2.7UJ	MG/KG
MAGNESIUM	1170J	MG/KG	1170J	MG/KG	1820J	MG/KG	1490J	MG/KG	939J	MG/KG	1420J	MG/KG
MERCURY	0.1UJ	MG/KG										
NICKEL	13.2	MG/KG	12.5	MG/KG	18.8	MG/KG	23.9	MG/KG	8.3	MG/KG	21.9	MG/KG
POTASSIUM	124000	MG/KG	124000	MG/KG	125000	MG/KG	152000	MG/KG	127000	MG/KG	174000	MG/KG
SELENIUM	10.2U	MG/KG	10.2U	MG/KG	10.5U	MG/KG	11.2U	MG/KG	9.7U	MG/KG	10.8U	MG/KG
SILVER	33.1	MG/KG	33.0	MG/KG	22.6	MG/KG	41.0	MG/KG	21.7	MG/KG	30.2	MG/KG
SODIUM	144000	MG/KG	143000	MG/KG	98300	MG/KG	161000	MG/KG	160000	MG/KG	126000	MG/KG
BORON	125	MG/KG	127	MG/KG	86.6	MG/KG	118	MG/KG	118J	MG/KG	385	MG/KG

*** TCLP INORGANICS ***

ANALYTE

ALUMINUM	90.0U	UG/L	NA	426	UG/L	90.0U	UG/L	90.0U	UG/L	90.0U	UG/L
ARSENIC	85.0U	UG/L	NA	81.0U	UG/L	122U	UG/L	93.0U	UG/L	99.0U	UG/L
BARIUM	1200J	UG/L	NA	607J	UG/L	1390J	UG/L	1460J	UG/L	1470J	UG/L
CADMIUM	39.0	UG/L	NA	5.0U	UG/L	26.0	UG/L	27.0	UG/L	5.0U	UG/L
CALCIUM	2770000	UG/L	NA	2680000	UG/L	1470000	UG/L	2110000	UG/L	1310000	UG/L
CHROMIUM	173	UG/L	NA	222	UG/L	23.0	UG/L	37.0	UG/L	102	UG/L
IRON	50.0U	UG/L	NA	66.0U	UG/L	123	UG/L	47.0U	UG/L	30.0U	UG/L
LEAD	20.0UJ	UG/L	NA	20.0UJ	UG/L	20.0UJ	UG/L	20.0UJ	UG/L	20.0UJ	UG/L
MAGNESIUM	27300	UG/L	NA	227	UG/L	21800	UG/L	21400	UG/L	15000J	UG/L
MERCURY	0.1U	UG/L	NA	0.1U	UG/L	0.1U	UG/L	0.1U	UG/L	0.1U	UG/L
NICKEL	268	UG/L	NA	30.0	UG/L	387	UG/L	255	UG/L	265	UG/L
SELENIUM	320UJ	UG/L	NA	80.0UJ	UG/L	80.0UJ	UG/L	80.0UJ	UG/L	80.0UJ	UG/L
SILVER	56.0J	UG/L	NA	3.0UJ	UG/L	73.0J	UG/L	49.0J	UG/L	47.0J	UG/L
pH	7.4		NA	11.7		7.5		7.4		7.3	

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC37408T SC37408TD SC38408T SC39408T SC40408T SC424XXT
05/13/88 05/13/88 05/19/88 10/04/88 05/18/88 10/08/88
01/20/92 01/20/92 01/20/92 01/20/92 01/20/92 01/21/92
DUPLICATE

*** MISCELLANEOUS ***

PARAMETER

CYANIDE-AMENABLE	+4.9	MG/KG	+5.9	MG/KG	+1.3	MG/KG	+7.0	MG/KG	+3.4	MG/KG	+4.9	MG/KG
CYANIDE-TOTAL	8.0	MG/KG	8.6	MG/KG	5.6	MG/KG	12	MG/KG	6.0	MG/KG	7.0	MG/KG
GROSS ALPHA	140+/-20	pCi/g	190+/-20	pCi/g	280+/-30	pCi/g	180+/-20	pCi/g	100+/-20	pCi/g	82+/-15	pCi/g
GROSS BETA	160+/-20	pCi/g	170+/-20	pCi/g	470+/-50	pCi/g	190+/-20	pCi/g	190+/-20	pCi/g	180+/-20	pCi/g
pH	13.1		13.0		13.1		13.3		13.2		13.3	
AMMONIA	<10	MG/KG	<10	MG/KG	<10	MG/KG	10	MG/KG	<10	MG/KG	<10	MG/KG
MOISTURE - GRAVIMETRIC	21.5	%	21.8	%	23.8	%	28.8	%	17.8	%	26.1	%
TOC	4400	MG/KG	4400	MG/KG	3200	MG/KG	4000	MG/KG	3200	MG/KG	4100	MG/KG
SWELL TEST	0	%	NA		0	%	0	%	0	%	0	%
BULK DENSITY	0.77	G/CC	NA		1.81		1.85		1.96		1.84	
UNCONFINED COMPRESSIVE STRENG	NA		NA		145	PSI	NA		NA		NA	
UNIT WEIGHT OF SHELBY TUBE	1.08	G/CC	NA		1.37	G/CC	1.37	G/CC	NA		1.25	G/CC
FLT CAKE-SPEC GRAV	2.62		NA		2.69		2.83		2.93		2.70	
FLT CAKE-SPEC GRAV (SALT RINS)	1.89		NA		2.18		2.47		2.42		2.72	
VISCOSITY	160	CP	NA		160	CP	1900	CP	125	CP	1375	CP
% WATER (KARL FISHER)	23.0	%	NA		22.1	%	29.9	%	20.2	%	27.3	%
% SOLIDS (FILTERCAKE)	77.4	%	NA		77.9	%	71.0	%	81.1	%	71.8	%
GRAIN SIZE - SIEVE 3/8 IN	NA		NA		100.0	%	100.0	%	NA		100.0	%
GRAIN SIZE - SIEVE 3/4 IN	NA											
GRAIN SIZE - SIEVE NO. 4	100.0	%	NA		97.5	%	99.6	%	100.0	%	99.6	%
GRAIN SIZE - SIEVE NO. 10	98.5	%	NA		81.3	%	96.2	%	96.8	%	92.0	%
GRAIN SIZE - SIEVE NO. 20	65.8	%	NA		42.4	%	74.1	%	75.5	%	63.1	%
GRAIN SIZE - SIEVE NO. 40	NA											
GRAIN SIZE - SIEVE NO. 50	33.1	%	NA		24.4	%	48.8	%	43.7	%	43.8	%
GRAIN SIZE - SIEVE NO. 100	16.1	%	NA		14.1	%	27.7	%	20.8	%	28.6	%
GRAIN SIZE - SIEVE NO. 140	NA											
GRAIN SIZE - SIEVE NO. 200	6.0	%	NA		5.1	%	8.3	%	6.4	%	10.3	%
PYCNOMETER FIL - SPEC. GRAV.	1.068		NA		1.053		1.068		1.073		1.068	
PYCNOMETER FIL - SOLIDS DISS.	92000	MG/L	NA		69000	MG/L	95000	MG/L	96000	MG/L	92000	MG/L
PYCNOMETER FIL - pH	12.6		NA		12.9		12.8		12.7		12.8	
SALT RINSE FIL - SPEC. GRAV.	1.098		NA		1.083		1.103		1.108		1.053	
SALT RINSE FIL - SOLIDS DISS.	140000	MG/L	NA		110000	MG/L	140000	MG/L	140000	MG/L	70000	MG/L
SALT RINSE FIL - pH	12.8		NA		12.9		13.0		12.7		12.8	

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC37408T SC37408TD SC38408T SC39408T SC40408T SC424XXT
05/13/88 05/13/88 05/19/88 10/04/88 05/18/88 10/08/88
01/20/92 01/20/92 DUPLICATE 01/20/92 01/20/92 01/21/92

*** ASTM LEACHATES ***

PARAMETER

CHLORIDE	680	MG/L	NA	660	MG/L	540	MG/L	420	MG/L	610	MG/L
NITRATE	3200	MG/L	NA	2600	MG/L	3200	MG/L	3200	MG/L	2700	MG/L
PERCENT RECOVERY OF SOLIDS	21.4	%	NA	35.4	%	21.8	%	21.0	%	24.4	%
PHOSPHORUS	<0.01	MG/L	NA	<0.01	MG/L	<0.01	MG/L	<0.01	MG/L	<0.01	MG/L
SULFATE	2000	MG/L	NA	1400	MG/L	1600	MG/L	3700	MG/L	1400	MG/L
TDS	29000	MG/L	NA	23000	MG/L	27000	MG/L	32000	MG/L	28000	MG/L

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC435XXT SC435XXTD SC445XXT
08/07/87 08/07/87 UNKNOWN
01/21/92 01/21/92 01/21/92
DUPLICATE

*** VOLATILES ***

COMPOUND

METHYLENE CHLORIDE	7U	UG/KG	7U	UG/KG	7U	UG/KG
ACETONE	73U	UG/KG	36U	UG/KG	53U	UG/KG
CARBON DISULFIDE	7U	UG/KG	7U	UG/KG	7U	UG/KG
1,1-DICHLOROETHENE	7U	UG/KG	7U	UG/KG	7U	UG/KG
2-BUTANONE	14U	UG/KG	14U	UG/KG	4U	UG/KG
1,1,1-TRICHLOROETHANE	7U	UG/KG	17J	UG/KG	6J	UG/KG
CARBON TETRACHLORIDE	7U	UG/KG	7U	UG/KG	7U	UG/KG
TRICHLOROETHENE	7U	UG/KG	7U	UG/KG	7U	UG/KG
1,1,2-TRICHLOROETHANE	7U	UG/KG	7U	UG/KG	7U	UG/KG
BENZENE	7U	UG/KG	7U	UG/KG	7U	UG/KG
4-METHYL-2-PENTANONE	14U	UG/KG	14U	UG/KG	14U	UG/KG
TETRACHLOROETHENE	7UJ	UG/KG	12J	UG/KG	5J	UG/KG
TOLUENE	7U	UG/KG	7U	UG/KG	7U	UG/KG
CHLOROBENZENE	7U	UG/KG	7U	UG/KG	7U	UG/KG
ETHYLBENZENE	7U	UG/KG	7U	UG/KG	7U	UG/KG
XYLENE (total)	7U	UG/KG	7U	UG/KG	7U	UG/KG
TRICHLOROFLUOROMETHANE	7UJ	UG/KG	7U	UG/KG	7U	UG/KG
FREON 113	7U	UG/KG	7U	UG/KG	7U	UG/KG
ETHYL ETHER	7U	UG/KG	7U	UG/KG	7U	UG/KG
ETHYL ACETATE	7U	UG/KG	7U	UG/KG	7U	UG/KG

*** SEMIVOLATILES ***

COMPOUND

1,4-DICHLOROBENZENE	460U	UG/KG	480U	UG/KG	450U	UG/KG
1,2-DICHLOROBENZENE	460U	UG/KG	480U	UG/KG	450U	UG/KG
N-NITROSO-DI-N-PROPYLAMINE	460U	UG/KG	480U	UG/KG	450U	UG/KG
1,2,4-TRICHLOROBENZENE	460U	UG/KG	480U	UG/KG	450U	UG/KG
ACENAPHTHENE	460U	UG/KG	480U	UG/KG	450U	UG/KG
2,4-DINITROTOLUENE	460U	UG/KG	480U	UG/KG	450U	UG/KG
PYRENE	460U	UG/KG	480U	UG/KG	450U	UG/KG
CYCLOHEXANONE	460U	UG/KG	480U	UG/KG	450U	UG/KG
PYRIDINE	460U	UG/KG	480U	UG/KG	450U	UG/KG
2-NITROPROPANE	460U	UG/KG	480U	UG/KG	450U	UG/KG

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC435XXT SC435XXTD SC445XXT
08/07/87 08/07/87 UNKNOWN
01/21/92 01/21/92 01/21/92
DUPLICATE

*** ALCOHOLS ***

COMPOUND

2-ETHOXYETHANOL	<500	MG/KG	<500	MG/KG	<500	MG/KG
ISOBUTANOL	<10	MG/KG	<10	MG/KG	<10	MG/KG
METHANOL	<10	MG/KG	<10	MG/KG	<10	MG/KG
N-BUTYL ALCOHOL	<10	MG/KG	<10	MG/KG	<10	MG/KG

*** INORGANICS ***

ANALYTE

ALUMINUM	6560J	MG/KG	6830J	MG/KG	6390J	MG/KG
ARSENIC	11.2U	MG/KG	16.4U	MG/KG	8.2UJ	MG/KG
BARIUM	135	MG/KG	140	MG/KG	88.3	MG/KG
CADMIUM	4.0	MG/KG	3.9	MG/KG	2.5	MG/KG
CALCIUM	109000	MG/KG	115000	MG/KG	102000	MG/KG
CHROMIUM	13.6J	MG/KG	16.7J	MG/KG	30.4J	MG/KG
IRON	4710	MG/KG	4940	MG/KG	4340	MG/KG
LEAD	2.8UJ	MG/KG	2.9UJ	MG/KG	2.7UJ	MG/KG
MAGNESIUM	1680J	MG/KG	1740J	MG/KG	1960J	MG/KG
MERCURY	0.1UJ	MG/KG	0.1UJ	MG/KG	0.1UJ	MG/KG
NICKEL	17.2	MG/KG	17.6	MG/KG	15.8	MG/KG
POTASSIUM	59000	MG/KG	56500J	MG/KG	50100	MG/KG
SELENIUM	45.2U	MG/KG	11.6U	MG/KG	10.9U	MG/KG
SILVER	18.8	MG/KG	19.6	MG/KG	37.1	MG/KG
SODIUM	174000	MG/KG	179000	MG/KG	198000	MG/KG
BORON	2020	MG/KG	2210	MG/KG	905	MG/KG

*** TCLP INORGANICS ***

ANALYTE

ALUMINUM	90.0U	UG/L	NA	1330	UG/L
ARSENIC	100U	UG/L	NA	135U	UG/L
BARIUM	872J	UG/L	NA	1110J	UG/L
CADMIUM	29.0	UG/L	NA	35.0	UG/L
CALCIUM	207000	UG/L	NA	2000000J	UG/L
CHROMIUM	123	UG/L	NA	83.0	UG/L
IRON	28.0U	UG/L	NA	493J	UG/L
LEAD	20.0UJ	UG/L	NA	20.0UJ	UG/L
MAGNESIUM	10300	UG/L	NA	17500	UG/L
MERCURY	0.1U	UG/L	NA	0.1U	UG/L
NICKEL	174	UG/L	NA	169	UG/L
SELENIUM	80.0UJ	UG/L	NA	80.0UJ	UG/L
SILVER	3.0UJ	UG/L	NA	3.0UJ	UG/L
pH	9.0		NA	9.2	

TITLE: TRIWALL

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SC435XXT
08/07/87
01/21/92
DUPLICATE

SC435XXTD
08/07/87
01/21/92

SC445XXT
UNKNOWN
01/21/92

*** MISCELLANEOUS ***

PARAMETER

CYANIDE-AMENABLE	+6.0	MG/KG	+4.8	MG/KG	+7.9	MG/KG
CYANIDE-TOTAL	9.3	MG/KG	9.0	MG/KG	10	MG/KG
GROSS ALPHA	190+/-20	pCi/g	75+/-14	pCi/g	110+/-20	pCi/g
GROSS BETA	140+/-20	pCi/g	120+/-20	pCi/g	170+/-20	pCi/g
PH	13.1		13.2		13.1	
AMMONIA	<10	MG/KG	<10	MG/KG	<10	MG/KG
MOISTURE - GRAVIMETRIC	29.2	%	31.3	%	26.7	%
TOC	3000	MG/KG	3900	MG/KG	4400	MG/KG
SWELL TEST	0	%	NA		0	%
BULK DENSITY	0.67	G/CC	NA		0.68	G/CC
UNCONFINED COMPRESSIVE STRENG	NA		NA		INT	
UNIT WEIGHT OF SHELBY TUBE	0.94	G/CC	NA		INT	
FLT CAKE-SPEC GRAV	2.64		NA		2.65	
FLT CAKE-SPEC GRAV (SALT RINS)	2.49		NA		2.22	
VISCOSITY	780	CP	NA		250	CP
% WATER (KARL FISHER)	30.4	%	NA		24.3	%
% SOLIDS (FILTERCAKE)	68.9	%	NA		76.2	%
GRAIN SIZE - SIEVE 3/8 IN	NA		NA		NA	
GRAIN SIZE - SIEVE 3/4 IN	NA		NA		NA	
GRAIN SIZE - SIEVE NO. 4	100.0	%	NA		100.0	%
GRAIN SIZE - SIEVE NO. 10	99.3	%	NA		93.4	%
GRAIN SIZE - SIEVE NO. 20	55.3	%	NA		38.5	%
GRAIN SIZE - SIEVE NO. 40	NA		NA		NA	
GRAIN SIZE - SIEVE NO. 50	30.2	%	NA		20.6	%
GRAIN SIZE - SIEVE NO. 100	15.9	%	NA		10.6	%
GRAIN SIZE - SIEVE NO. 140	NA		NA		NA	
GRAIN SIZE - SIEVE NO. 200	4.7	%	NA		2.9	%
PYCNOMETER FIL - SPEC. GRAV.	1.063		NA		1.063	
PYCNOMETER FIL - SOLIDS DISS.	86000	MG/L	NA		89000	MG/L
PYCNOMETER FIL - pH	12.6		NA		12.7	
SALT RINSE FIL - SPEC. GRAV.	1.088		NA		1.098	
SALT RINSE FIL - SOLIDS DISS.	130000	MG/L	NA		140000	MG/L
SALT RINSE FIL - pH	12.7		NA		12.8	

TITLE: TRIWALL

SAMPLE ID NUMBER:	SC435XXT	SC435XXTD	SC445XXT
ACCUMULATION DATE:	08/07/87	08/07/87	UNKNOWN
DATE SAMPLED:	01/21/92	01/21/92	01/21/92
COMMENT:	DUPLICATE		

*** ASTM LEACHATES ***

PARAMETER

CHLORIDE	310	MG/L	NA	6200	MG/L
NITRATE	2900	MG/L	NA	3300	MG/L
PERCENT RECOVERY OF SOLIDS	28.2	%	NA	25.8	%
PHOSPHORUS	<0.01	MG/L	NA	<0.01	MG/L
SULFATE	1200	MG/L	NA	3000	MG/L
TDS	23000	MG/L	NA	27000	MG/L

TITLE: COMPOSIT

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SCCOMPH SCCOMPM SCCOMPT
NA NA NA
03/05/92 03/05/92 03/05/92

*** VOLATILES ***

COMPOUND

METHYLENE CHLORIDE	6U	UG/KG	6U	UG/KG	6U	UG/KG
ACETONE	11J	UG/KG	20J	UG/KG	15J	UG/KG
CARBON DISULFIDE	6U	UG/KG	6U	UG/KG	6U	UG/KG
1,1-DICHLOROETHENE	6U	UG/KG	6U	UG/KG	6U	UG/KG
2-BUTANONE	6U	UG/KG	6U	UG/KG	6U	UG/KG
1,1,1-TRICHLOROETHANE	6U	UG/KG	6U	UG/KG	6U	UG/KG
CARBON TETRACHLORIDE	6U	UG/KG	6U	UG/KG	6U	UG/KG
TRICHLOROETHENE	6U	UG/KG	6U	UG/KG	6U	UG/KG
1,1,2-TRICHLOROETHANE	6U	UG/KG	6U	UG/KG	6U	UG/KG
BENZENE	6U	UG/KG	6U	UG/KG	6U	UG/KG
4-METHYL-2-PENTANONE	12U	UG/KG	12U	UG/KG	12U	UG/KG
TETRACHLOROETHENE	6U	UG/KG	6U	UG/KG	6U	UG/KG
TOLUENE	6U	UG/KG	6U	UG/KG	6U	UG/KG
CHLOROBENZENE	6U	UG/KG	6U	UG/KG	6U	UG/KG
ETHYLBENZENE	6U	UG/KG	6U	UG/KG	6U	UG/KG
XYLENE (total)	6U	UG/KG	6U	UG/KG	6U	UG/KG
TRICHLOROFLUOROMETHANE	6U	UG/KG	6U	UG/KG	6U	UG/KG
FREON 113	6U	UG/KG	6U	UG/KG	6U	UG/KG
ETHYL ETHER	6U	UG/KG	6U	UG/KG	6U	UG/KG
ETHYL ACETATE	6U	UG/KG	6U	UG/KG	6U	UG/KG

*** SEMIVOLATILES ***

COMPOUND

1,4-DICHLOROBENZENE	400U	UG/KG	400U	UG/KG	410U	UG/KG
1,2-DICHLOROBENZENE	400U	UG/KG	400U	UG/KG	410U	UG/KG
N-NITROSO-DI-N-PROPYLAMINE	400U	UG/KG	400U	UG/KG	410U	UG/KG
1,2,4-TRICHLOROBENZENE	400U	UG/KG	400U	UG/KG	410U	UG/KG
ACENAPHTHENE	400U	UG/KG	400U	UG/KG	410U	UG/KG
2,4-DINITROTOLUENE	400U	UG/KG	400U	UG/KG	410U	UG/KG
PYRENE	400U	UG/KG	400U	UG/KG	410U	UG/KG
CYCLOHEXANONE	400U	UG/KG	400U	UG/KG	410U	UG/KG
PYRIDINE	400U	UG/KG	400U	UG/KG	410U	UG/KG
2-NITROPROPANE	400U	UG/KG	400U	UG/KG	410U	UG/KG

TITLE: COMPOSIT

SAMPLE ID NUMBER:

SCCOMPH

NA

03/05/92

SCCOMPM

NA

03/05/92

SCCOMPT

NA

03/05/92

ACCUMULATION DATE:

DATE SAMPLED:

COMMENT:

*** ALCOHOLS ***

COMPOUND

2-ETHOXYETHANOL
ISOBUTANOL
METHANOL
N-BUTYL ALCOHOL

	<500 MG/KG	<500 MG/KG	<500 MG/KG
2-ETHOXYETHANOL	<10 MG/KG	<10 MG/KG	<10 MG/KG
ISOBUTANOL	<10 MG/KG	<10 MG/KG	<10 MG/KG
METHANOL	<10 MG/KG	<10 MG/KG	<10 MG/KG
N-BUTYL ALCOHOL	<10 MG/KG	<10 MG/KG	<10 MG/KG

*** INORGANICS ***

ANALYTE

ALUMINUM
ARSENIC
BARIUM
CADMIUM
CALCIUM
CHROMIUM
IRON
LEAD
MAGNESIUM
MERCURY
NICKEL
POTASSIUM
SELENIUM
SILVER
SODIUM
BORON

	7790 MG/KG	4770 MG/KG	5250 MG/KG
ALUMINUM	8.6U MG/KG	13.8 MG/KG	16.7 MG/KG
ARSENIC	168 MG/KG	80.1 MG/KG	101 MG/KG
BARIUM	3.7 MG/KG	2.6 MG/KG	2.1 MG/KG
CADMUM	173000 MG/KG	86200J MG/KG	98000 MG/KG
CALCIUM	47.1 MG/KG	17.1 MG/KG	22.1 MG/KG
CHROMIUM	7780J MG/KG	3770J MG/KG	4750 MG/KG
IRON	4.6 MG/KG	3.7U MG/KG	3.8U MG/KG
LEAD	3130 MG/KG	1840 MG/KG	1630 MG/KG
MAGNESIUM	0.1U MG/KG	0.1U MG/KG	0.1U MG/KG
MERCURY	23.6 MG/KG	41.4 MG/KG	29.8 MG/KG
NICKEL	113000 MG/KG	114000 MG/KG	92100J MG/KG
POTASSIUM	24.4U MG/KG	6.1U MG/KG	6.3U MG/KG
SELENIUM	34.5 MG/KG	38.3 MG/KG	24.9 MG/KG
SILVER	91100 MG/KG	134000 MG/KG	147000J MG/KG
BORON	111J MG/KG	667 MG/KG	412 MG/KG

*** TCLP INORGANICS ***

ANALYTE

ALUMINUM
ARSENIC
BARIUM
CADMIUM
CALCIUM
CHROMIUM
IRON
LEAD
MAGNESIUM
MERCURY
NICKEL
SELENIUM
SILVER
pH

	171 UG/L	1340 UG/L	1210 UG/L
ALUMINUM	212 UG/L	323 UG/L	290 UG/L
ARSENIC	957J UG/L	585 UG/L	597 UG/L
BARIUM	5.0U UG/L	5.0U UG/L	5.0U UG/L
CADMUM	818000 UG/L	625000 UG/L	509000 UG/L
CALCIUM	517 UG/L	71.0 UG/L	143 UG/L
CHROMIUM	65.0 UG/L	142 UG/L	144 UG/L
IRON	30.0U UG/L	30.0U UG/L	30.0U UG/L
LEAD	46.0 UG/L	47.0 UG/L	54.0 UG/L
MAGNESIUM	0.2U UG/L	0.2U UG/L	0.2U UG/L
MERCURY	94.0 UG/L	141 UG/L	42.0 UG/L
NICKEL	50.0U UG/L	50.0U UG/L	50.0U UG/L
SELENIUM	5.0U UG/L	5.0U UG/L	5.0U UG/L
SILVER	12.4	12.0	12.1

TITLE: COMPOSIT

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SCCOMPH
NA
03/05/92

SCCOMPM
NA
03/05/92

SCCOMPT
NA
03/05/92

*** MISCELLANEOUS ***

PARAMETER

CYANIDE-AMENABLE	-79	MG/KG	24	MG/KG	18	MG/KG
CYANIDE-TOTAL	73J	MG/KG	36J	MG/KG	20J	MG/KG
GROSS ALPHA	210+/-30	pCi/g	430+/-50	pCi/g	310+/-40	pCi/g
GROSS BETA	140+/-20	pCi/g	200+/-20	pCi/g	220+/-30	pCi/g
pH	13.1		13.0		12.8	
AMMONIA	<10	MG/KG	<10	MG/KG	<10	MG/KG
MOISTURE - GRAVIMETRIC	18.2	%	18.1	%	20.4	%
TOC	3500	MG/KG	4100	MG/KG	3400	MG/KG
SWELL TEST	10	%	0	%	0	%
BULK DENSITY	0.88	G/CC	0.81	G/CC	0.93	G/CC
FLT CAKE-SPEC GRAV	2.90		2.96		3.00	
FLT CAKE-SPEC GRAV (SALT RINS)	2.42		2.30		2.53	
VISCOSITY	145	CP	140	CP	125	CP
% WATER (KARL FISHER)	21.5	%	23.6	%	22.2	%
GRAIN SIZE - SIEVE 3/8 IN	NA		NA		NA	
GRAIN SIZE - SIEVE 3/4 IN	NA		NA		NA	
GRAIN SIZE - SIEVE NO. 4	100.0	%	100.0	%	100.0	%
GRAIN SIZE - SIEVE NO. 10	99.9	%	98.6	%	99.9	%
GRAIN SIZE - SIEVE NO. 20	62.6	%	58.1	%	63.6	%
GRAIN SIZE - SIEVE NO. 40	N/A		N/A		N/A	
GRAIN SIZE - SIEVE NO. 50	33.7	%	31.6	%	32.7	%
GRAIN SIZE - SIEVE NO. 100	21.6	%	16.1	%	16.8	%
GRAIN SIZE - SIEVE NO. 140	N/A		N/A		N/A	
GRAIN SIZE - SIEVE NO. 200	11.6	%	5.1	%	5.0	%
PYCNOMETER FIL - SPEC. GRAV.	1.053		1.063		1.063	
PYCNOMETER FIL - SOLIDS DISS.	67000J	MG/L	90000J	MG/L	80000J	MG/L
PYCNOMETER FIL - pH	12.8		12.7		12.7	
SALT RINSE FIL - SPEC. GRAV.	1.078		1.098		1.093	
SALT RINSE FIL - SOLIDS DISS.	110000J	MG/L	140000J	MG/L	140000J	MG/L
SALT RINSE FIL - pH	12.9		12.8		12.8	

TITLE: COMPOSIT

SAMPLE ID NUMBER:
ACCUMULATION DATE:
DATE SAMPLED:
COMMENT:

SCCOMPH SCCOMPM SCCOMPT
NA NA NA
03/05/92 03/05/92 03/05/92

*** ASTM LEACHATES ***

PARAMETER

CHLORIDE	1800	MG/L	4400	MG/L	14000	MG/L
NITRATE	1500	MG/L	2700	MG/L	3000	MG/L
PERCENT RECOVERY OF SOLIDS	40	%	25.6	%	25.6	%
PHOSPHORUS	<0.01UJ	MG/L	<0.01UJ	MG/L	<0.01UJ	MG/L
SULFATE	2600	MG/L	2300	MG/L	2200	MG/L
TDS	22000J	MG/L	27000J	MG/L	29000J	MG/L

APPENDIX C
DATA VALIDATION COVER LETTERS



INTERNAL CORRESPONDENCE

C-49-3-2-388

TO: RICH NINESTEEL

DATE: MAY 15, 1992

FROM: MARK L. MENGEL

COPIES: D. A. SCHEIB

SUBJECT: ORGANIC DATA VALIDATION - VOA/BNAs
ROCKY FLATS
CASE NO. SLCR1, SDG PKG1

SAMPLES:

Volatiles and Semivolatiles:

15/solids/SC01408M, SC02408T, SC3408TD, SC03408T, SC04408T,
SC05410T, SC06410T, SC07408T, SC08408T, SC09408T,
SC10408T, SC11408T, SC12408T, SC13408T, SC14408T,

Volatiles:

1/aqueous/SC02408TT

A validation was performed on the organic analytical data from the volatile and semivolatile fraction analyses of Case No. SLCR1, SDG PKG 1, low level soil samples collected by HALLIBURTON NUS Environmental Corporation on 01/13/92 and 01/14/92 at the Rocky Flats site. One trip blank was included with this analytical set. The data were reviewed with reference to the EPA "Functional Guidelines for Evaluating Organic Analyses" as applied for use within Region VIII and were evaluated based on the following parameters:

- * • Data Completeness
- * • Holding Times
- * • GC/MS Tuning
- Calibrations
- Blanks
- Surrogate Spike Recoveries
- * • Matrix Spike/Matrix Spike Duplicate
- Internal Standards Performance
- * • Compound Identification
- * • Compound Quantitation

* - All quality control criteria were met for this parameter.

C-49-3-2-388
MR. RICH NINESTEEL
MAY 15, 1992
PAGE TWO

The attached Table 1 summarizes the validation qualifications which were based on the following information:

CALIBRATIONS

The following tables summarize calibration non-compliances and corresponding actions. The key associated with these tables is presented on page four of this memorandum.

Volatiles

<u>Compound</u>	<u>IC</u>	
	<u>11/22/91</u>	
acetone	X	
Associated Samples:	SC02408T, SC03408T, SC04408T, SC05410T, SC06410T, SC3408TD, SC07408T, SC08408T, SC09408T, SC10408T, SC11408T, SC12408T, SC13408T, SC14408T	
<u>Compound</u>	<u>CC</u>	<u>CC</u>
	<u>11/22/91</u>	<u>11/23/91</u>
acetone	X	XX
carbon disulfide		X
2-butanone		X
1,1,1-trichloroethane	X	X
carbon tetrachloride	X	
4-methyl-2-pentanone		X
trichlorofluoromethane	X	X
1,1,2-TC-1,2,2-TFA	X	XX
ethyl ether	XX	XX
Associated Samples:	SC02408T, SC03408T, SC04408T, SC05410T, SC06410T, SC03408TD, SC07408T, SC08408T	SC09408T, SC10408T, SC11408T, SC12408T, SC13408T, SC14408T

No action was taken for acetone because it was qualified based upon blank contamination. Positive results for 1,1,2-TC-1,2,2-TFA were qualified based upon blank contamination. Non detects for ethyl ether and 1,1,2-TC-1,2,2-TFA were qualified as estimated "UJ". No other qualifications were made because as no positive results were reported in the affected samples.

C-49-3-2-388
MR. RICH NINESTEEL
MAY 15, 1992
PAGE THREE

<u>Compound</u>	<u>IC</u> <u>01/12/92</u>	<u>CC</u> <u>01/17/92</u>
acetone	X	XX
carbon disulfide		X
2-butanone		X
tetrachloroethene		X
trichlorofluoromethane		XX
ethyl acetate		X

Associated Samples: SC01408M SC01408M

<u>Compound</u>	<u>CC</u> <u>01/23/92</u>
acetone	XX
carbon disulfide	XX
2-butanone	X
4-methyl-2-pentanone	XX
tetrachloroethane	X
trichlorofluoromethane	XX
1,1,2-TC-1,2,2-TFA	XX
ethyl ether	XX

Associated samples: SC02408TT

No action was taken for positive result for acetone because it was qualified based upon blank contamination in the associated sample. Non detects for acetone, carbon disulfide, 4-methyl-2-pentanone, trichlorofluoromethane, ethyl ether, and 1,1,2-TC-1,2,2-TFA were qualified as estimated UJ. No other qualifications were made as no positive results were reported in the affected samples.

Semivolatiles

<u>Compound</u>	<u>CC</u> <u>01/27/92</u>
pyrene	X

Associated samples: SC01408M

C-49-3-2-388
MR. RICH NINESTEEL
MAY 15, 1992
PAGE FOUR

<u>Compound</u>	<u>CC</u> <u>01/28/92</u>	<u>CC</u> <u>01/27/92</u>
2-nitropropane	X	XX
pyridine		X
Associated Samples:	SC02408T SC03408T SC04408T SC05410T SC06410T SC07408T	SC3408TD SC08408T SC11408T SC12408T SC10408T

Non detects for 2-nitropropane are qualified as estimated "UJ" in the affected samples.

<u>Compound</u>	<u>CC</u> <u>01/28/92</u>
n-nitroso-di-n-propylamine	X
cyclohexanone	X
Associated samples:	SC13408T, SC14408T, SC09408T

Calibration Key:

- X - Percent RSD > 30; percent D > 25; Estimate (J) positive results.
XX - Percent RSD > 50; percent D > 50; Estimate (J) positive results and estimate (UJ) nondetects.

BLANKS

Volatiles

Laboratory method, field , and rinsate blanks contained the following contaminants in the maximum amounts indicated below:

<u>Compound</u>	<u>Maximum Concentration</u>
acetone	15 ug/kg
1,1,2-trichloro-1,2,2-trifluoroethane	11 ug/kg

Associated Samples: All samples

Action levels of ten times the maximum amount of common contaminants and five times the maximum amount of the other contaminants were used to evaluate the data.

C-49-3-2-388
MR. RICH NINESTEEL
MAY 15, 1992
PAGE FIVE

Blank Actions:

- Value < CRQL; report CRQL followed by a U.
- Value > CRQL and < action level; report value followed by a U.
- Value > CRQL and > action level; report value unqualified.

SURROGATES

Semivolatiles

The percent recovery for the terphenyl surrogate exceeded the upper quality control limit for sample SCO1408M. No action was taken however; as no positive results were reported in the affected sample.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Semivolatiles

The matrix spike/matrix spike duplicate (MS/MSD) Percent Recovery (%R) for 2,4-dinitrotoluene exceeded the upper quality control limit. No action was taken, however, as no positive result for 2,4-dinitrotoluene was reported in the unspiked sample.

INTERNAL STANDARDS

The internal standard, perylene-d12 was below the lower quality control limit for sample SC05410T. Non detects in the affected sample have been qualified as estimated "UJ".

No other problems were encountered in this case.

OVERALL ASSESSMENT

All data are accepted with minor problems qualified.

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Support Documentation

ROCKY FLATS SITE
CASE NO. SLCR1, SDG PKG1

TABLE 1 - QUALIFICATION SUMMARY

Sample No.	Volatile	Semivolatile
SC01408M	A ¹ ,J ¹	
SC02408T	A ¹ ,J ³	
SC03408T	A ¹ ,J ³	
SC03408TD	J ³	J ⁵
SC04408T	A ¹ ,J ³	
SC05410T	A ^{1,2} ,J ³	
SC06410T	A ^{1,2} ,J ³	
SC07408T	A ¹ ,J ³	
SC08408T	A ¹ ,J ³	J ⁵
SC09408T	A ^{1,2} ,J ³	
SC10408T	A ^{1,2} ,J ³	J ⁵
SC11408T	A ^{1,2} ,J ³	J ⁵
SC12408T	A ^{1,2} ,J ³	J ⁵
SC13408T	A ^{1,2} ,J ^{3,4}	
SC14408T	A ^{1,2} ,J ³	
SC02408TT	J ²	

A¹ - Change positive result for acetone to a revised detection limit because of blank contamination.

A² - Change positive result for 1,1,2-trichloro-1,2,2-trifluoroethane to a revised detection limit because of blank contamination.

J¹ - Estimate "UJ" nondetects for trichlorofluoromethane due to continuing calibration Percent Difference (%D) > 50.

J² - Estimate "UJ" nondetect for acetone, carbon disulfide, 4-methyl-2-pentanone, 1,1,2-trichloro-1,2,2-trifluoroethane, trichlorofluoromethane and ethyl ether due to continuing calibration %D > 50.

J³ - Estimate "UJ" nondetect for ethyl ether due to continuing calibration %D > 50.

J⁴ - Estimate "J" positive result for 2-butanone due to continuing calibration %D > 25.

J⁵ - Estimate "UJ" nondetects for 2-nitropropane due to continuing calibration %D 50.



INTERNAL CORRESPONDENCE

C-49-4-2-43

TO: RICH NINESTEEL
FROM: KAREN SABOLOSKY
SUBJECT: ORGANIC DATA VALIDATION - VOA/BNAS
ROCKY FLATS
CASE NO. SLCR2, SDG PKG 2

DATE: APRIL 4, 1992
CC: DEB SCHEIB

SAMPLES:

Volatiles:

2/aqueous/ SC15408TT, SC14408TTW

Volatiles and Semivolatiles:

18/aqueous/ SC285XXT, SC29408T, SC30408T, SC15408T,
SC16408T, SC17408T, SC185XXT, SC195XXT,
SC205XXT, SC215XXT, SC225XXT, SC23408T,
SC24408T, SC25408T, SC26408T, SC275XXT,
SC14408TF, SC14408TB

A validation was performed on the organic analytical data from the volatile and semivolatile fractions of Case No. SLCR2, SDG PKG 2, aqueous samples collected by HALLIBURTON NUS Environmental Corporation on 1/15/92 and 1/16/92 at the Rocky Flats site. Two trip blanks, one rinsate blank and one field blank were included with this analytical set. The data were reviewed with reference to the EPA "Functional Guidelines for Evaluating Organic Analyses" as applied for use within Region VIII and were evaluated according to the following parameters:

- * • Data completeness
 - * • Holding times
 - * • GC/MS Tuning
 - Calibrations
 - Blanks
 - * • Surrogate spike recoveries
 - Matrix Spike/Matrix Spike Duplicates
 - * • Field Duplicate Performance
 - * • Internal Standards Performance
 - * • Compound Identification
 - * • Compound Quantitation
- * - All quality control criteria were met for this parameter.

The attached Table 1 summarizes the validation recommendations which were based on the following information:

C-49-4-2-43
MR. RICH NINESTEEL
APRIL 4, 1992
PAGE TWO

CALIBRATIONS

The following tables summarize calibration non-compliances and corresponding actions. The key associated with these tables is presented on page four of this memorandum.

Volatiles

<u>Compound</u>	IC
acetone	<u>1/12/92</u>
	X
Associated Samples:	SC17408T, SC205XXT, SC225XXT, SC23408T, SC24408T, SC185XXT, SC215XXT, SC25408T, SC26408T, SC275XXT, SC285XXT, SC30408T, SC29408T, SC15408T, SC19508T

No action was necessary since positive results were qualified for blank contamination.

<u>Compound</u>	CC
acetone	<u>1/24/92</u>
	X
2-butanone	X
Associated Samples:	SC17408T, SC205XXT, SC225XXT, SC23408T, SC24408T, SC185XXT, SC215XXT, SC25408T, SC26408T

Positive results for 2-butanone were qualified as estimated, "J", in affected samples. No action was necessary for acetone since positive results and nondetects for this compound had been previously qualified for blank contamination.

<u>Compound</u>	CC
2-butanone	<u>1/25/92</u>
trichloroethene	X
4-methyl-2-pentanone	X
tetrachloroethene	XX
	X
Associated Samples:	SC275XXT, SC285XXT, SC30408T, SC29408T

No positive results were reported for 4-methyl-2-pentanone; associated nondetects for this compound were qualified as estimated, "UJ". No action was necessary for the remaining compounds since no positive results were reported for the noncompliant compounds in affected samples.

C-49-4-2-43
MR. RICH NINESTEEL
APRIL 4, 1992
PAGE THREE

Compound IC
acetone 1/22/92
 X

Associated Samples: SC15408T, SC16408T, SC195XXT

No action was necessary since positive results for acetone in affected samples had been previously qualified for blank contamination.

Compound CC
acetone 1/23/92
carbon disulfide XX
2-butanone X
1,1,1-trichloroethane X
4-methyl-2-pentanone X

Associated Samples: SC15408T, SC16408T, SC195XXT

Only positive results for acetone were reported in affected samples and these were previously qualified for blank contamination. Positive results in affected samples for 2-butanone were qualified as estimated, "J". No action was necessary for the remaining compounds since no positive results were reported for these compounds in affected samples.

Compound CC
acetone 1/23/92
carbon disulfide XX
2-butanone X
4-methyl-2-pentanone XX
tetrachloroethene X

Associated Samples: SC15408TT, SC14408TTW, SC14408TF,
SC14408TB.

No action was taken for acetone since results for this compound in affected samples had been previously qualified for blank contamination. No positive results were reported for carbon disulfide and 4-methyl-2-pentanone and nondetects for these compounds were qualified as estimated, "UJ", in affected samples. Positive results for 2-butanone were qualified as estimated, "J". No action was necessary for tetrachloroethene since no positive results were reported for this compound in affected samples.

C-49-4-2-43
MR. RICH NINESTEEL
APRIL 4, 1992
PAGE FOUR

Semivolatiles

<u>Compound</u>	CC <u>2/8/92</u>
N-nitroso-di-n-propylamine	X
cyclohexanone	X
Associated Samples:	SC185XXT, SC215XXT, SC24408T, SC25408T, SC26408T, SC195XXT, SC205XXT, SC225XXT, SC23408T, SC275XXT, SC285XXT, SC29408T

No action was necessary since no positive results were reported for these compounds in affected samples.

<u>Compound</u>	CC <u>2/10/92</u>
N-nitroso-di-n-propylamine	X
cyclohexanone	X
Associated Samples:	SC15408T, SC16408T, SC17408T, SC30408T

No action was taken since no positive results were reported for these compounds in affected samples.

Calibration Key:

X - Percent RSD > 30; percent D > 25; Estimate (J) positive results.
XX - Percent RSD > 50; percent D > 50; Estimate (J) positive results and estimate (UJ) nondetects.

BLANKS

Volatiles

Laboratory method rinsate, field and trip blanks contained the following contaminants in the maximum amounts indicated below:

Waters:

<u>Compound</u>	<u>Maximum Concentration</u>
acetone	15 ug/L
1,1,2-trichloro-1,2,2-trifluoroethane	11 ug/L

Associated Samples: All waters

Action levels of ten times the maximum amount of acetone detected in the blanks and five times the maximum amount of 1,1,2-trichloro-1,2,2-trifluoroethane found were used to evaluate the data.

C-49-4-2-43
MR. RICH NINESTEEL
APRIL 4, 1992
PAGE FIVE

Blank Actions:

- Value < CRQL; report CRQL followed by a U.
- Value > CRQL and < action level; report value followed by a U.
- Value > CRQL and > action level; report value unqualified.

MATRIX SPIKE/MATRIX SPIKE DUPLICATES

Semivolatiles

The matrix spike/matrix spike duplicate (MS/MSD) Percent Recovery (%R) for 2,4-dinitrotoluene exceeded the upper quality control limit. No action was taken however, since no positive results were reported for this compound in the unspiked sample.

No other problems were encountered in this case.

C-49-4-2-43
MR. RICH NINESTEEL
APRIL 2, 1992
PAGE SIX

ROCKY FLATS SITE
CASE NO. SLCR2, SDG PKG 2

TABLE 1 - QUALIFICATION SUMMARY

Sample No.	Volatile	Semivolatile
SC30408T	A ¹ ,J ²	
SC29408T	A ¹ ,J ²	
SC285XXT	A ¹ ,J ²	
SC15408T	A ^{1,2} ,J ³	
SC16408T	A ^{1,2} ,J ³	
SC17408T	A ¹	
SC185XXT	A ¹	
SC195XXT	A ^{1,2}	
SC205XXT	A ¹ ,J ³	
SC215XXT	A ¹ ,J ³	
SC225XXT	A ¹	
SC23408T	A ¹	
SC24408T	A ¹	
SC25408T	A ¹	
SC26408T	A ¹	
SC275XXT	A ¹ ,J ²	
SC14408TTW	A ¹ ,J ¹	
SC14408TF	A ¹ ,J ¹	
SC14408TB	A ¹ ,J ¹	
SC15408TT	A ¹ ,J ¹	

- A¹ - Change positive result for acetone to a revised detection limit because of blank contamination.
- A² - Change positive result for 1,1,2-trichloro-1,2,2-trifluoroethane to a revised detection limit because of blank contamination.
- J¹ - Estimate "UJ" nondetects for 4-methyl-2-pentanone and carbon disulfide due to %D > 50%.
- J² - Estimate "UJ" nondetects for 4-methyl-2-pentanone due to %D > 50%.
- J³ - Estimate "J" positive results for 2-butanone due to %D > 25%.



INTERNAL CORRESPONDENCE

C-49-4-2-162

TO: RICH NINESTEEL
FROM: KAREN SABOLOSKY
SUBJECT: ORGANIC DATA VALIDATION - VOA/BNAs
ROCKY FLATS
CASE NO. SLCR3, SDG PKG 3

SAMPLES:

Volatiles:

2/aqueous/SC355XXTTW, SC31XXXTT

Volatiles and Semivolatiles:

17/soil/ SC41408MB, SC31XXXT, SC325XXT, SC33XXXT,
SC355XXT, SC36408T, SC37408T, SC37408TD,
SC38408T, SC39408T, SC40408T, SC41408M,
SC424XXT, SC435XXT, SC435XXTD, SC445XXT.

6/aqueous/SC355XXTF, SC355XXTB, S41408MF, SC424XXTF
SC445XXTB, SC41408MD

A validation was performed on organic analytical data from the volatile and semivolatile fractions of Case No. SLCR3 SDG PKG 3, aqueous samples collected by HALLIBURTON NUS Environmental Corporation on 1/20/92 and 1/21/92 at the Rocky Flats site. Two trip blanks, three rinsate blanks, two field blanks and two field duplicate pairs were included with this analytical set. The data were reviewed with reference to the EPA "Functional Guidelines for Evaluating Organic Analyses" as applied for use within Region VIII and were evaluated according to the following parameters:

- * • Data completeness
 - * • Holding times
 - * • GC/MS Tuning
 - Calibrations
 - Blanks
 - * • Surrogate spike recoveries
 - Matrix Spike/Matrix Spike Duplicate Results
 - * • Field Duplicate Precision
 - * • Internal Standards Performance
 - * • Compound Identification
 - * • Compound Quantitation
- * - All quality control criteria were met for this parameter.

C-49-4-2-162
MR. RICH NINESTEEL
APRIL 16, 1992
PAGE TWO

The attached Table 1 summarizes the validation recommendations which were based on the following information:

CALIBRATIONS

The following tables summarize calibration non-compliances and corresponding actions. The key associated with these tables is presented on page five of this memorandum.

Volatiles

<u>Compound</u>	<u>IC</u>
acetone	1/22/92
	X
Associated Samples:	SC31XXXT, SC325XXT, SC33XXXT, SC36408T, SC37408T, SC37408TD, SC355XXTDL, SC34XXXT, SC355XXT.

Positive results not qualified for blank contamination were qualified as estimated, "J".

<u>Compound</u>	<u>CC</u>
acetone	1/25/92
2-butanone	XX
1,1,1-trichloroethane	XX
carbon tetrachloride	X
trichloroethene	X
4-methyl-2-pentanone	XX
Associated Samples:	SC31XXXT, SC325XXT, SC33XXXT, SC36408T, SC37408T, SC37408TD, SC37408T, SC355XXTDL, SC34XXXT, SC355XXT.

Positive results and nondetects for 4-methyl-2-pentanone were qualified as estimated, "J" and "UJ", respectively. No action was necessary for acetone since positive results were previously qualified for blank contamination or initial calibration noncompliance. No positive results were reported for 2-butanone in affected samples; associated nondetects were qualified as estimated, "UJ". No action was necessary for the remaining compounds since no positive results for these compounds were reported in affected samples.

C-49-4-2-162
MR. RICH NINESTEEL
APRIL 16, 1992
PAGE THREE

<u>Compound</u>	CC
acetone	<u>1/26/92</u>
carbon disulfide	X
4-methyl-2-pentanone	XX
Associated Samples:	SC31XXXTT, SC355XXTTW, SC355XXTF, SC355XXTB, SC41408MF, SC41408MB, SC424XXTF, SC445XXTB.

Positive results for acetone were qualified as estimated, "J" in affected samples. No positive results were reported for carbon disulfide and 4-methyl-2-pentanone in affected samples; associated nondetects were qualified as estimated, "UJ".

<u>Compound</u>	IC
acetone	<u>12/28/91</u>
Associated Samples:	X
Associated Samples:	SC435XXT, SC435XXTD, SC445XXT, SC38408T, SC39408T, SC40408T, SC41408M, SC41408MD, SC424XXT.

Positive results for acetone in affected samples, not qualified for blank contamination, were qualified as estimated, "J".

<u>Compound</u>	CC
acetone	<u>1/27/92</u>
1,1,1-trichloroethane	X
carbon tetrachloride	X
trichloroethene	X
tetrachloroethene	XX
Associated Samples:	SC435XXT, SC435XXTD, SC445XXT.

No action was necessary for acetone since positive results were previously qualified for blank contamination or initial calibration noncompliance. Positive results in affected samples for 1,1,1-trichloroethane were qualified as estimated, "J". Positive results and nondetects in affected samples for tetrachloroethene were qualified as estimated, "J" and "UJ", respectively. No action was necessary for the remaining compounds since no positive results were reported for these compounds in affected samples.

C-49-4-2-162
MR. RICH NINESTEEL
APRIL 16, 1992
PAGE FOUR

<u>Compound</u>	CC <u>1/25/92</u>
acetone	X
carbon disulfide	X
2-butanone	X
carbon tetrachloride	X
trichloroethene	XX
4-methyl-2-pentanone	X

Associated Samples: SC38408T, SC39408T, SC40408T, SC41408M,
SC41408MD, SC424XXT.

No action was necessary for acetone since positive results were previously qualified for blank contamination or initial calibration noncompliance. No action was taken for carbon disulfide, carbon tetrachloride and 4-methyl-2-pentanone since no positive results were reported for these compounds in affected samples. No positive results were reported for trichloroethene in affected samples; associated nondetects were qualified as estimated, "UJ". Positive results reported for 2-butanone in affected samples were qualified as estimated, "J".

Semivolatiles

<u>Compound</u>	CC <u>2/15/92</u>
2,4-dinitrotoluene	X
pyrene	X
cyclohexanone	X

Associated Samples: SC424XXTF, SC445XXTB.

No action was necessary since no positive results were reported for these compounds in affected samples.

<u>Compound</u>	CC <u>2/14/92</u>
2,4-dinitrotoluene	X
pyrene	X

Associated Samples: SC39408T, SC40408T, SC41408T, SC41408MD,
SC424XXT, SC435XXTD, SC445XXT, SC355XXTF,
SC355XXTB, SC41408MF, SC41408MB.

No action was taken since no positive results were reported for these compounds in affected samples.

C-49-4-2-162
MR. RICH NINESTEEL
APRIL 16, 1992
PAGE FIVE

Calibration Key:

- X - Percent RSD > 30; percent D > 25; Estimate (J) positive results.
XX - Percent RSD > 50; percent D > 50; Estimate (J) positive results and estimate (UJ) nondetects.

BLANKS

Volatiles

Laboratory method rinsate, field and trip blanks contained the following contaminants in the maximum amounts indicated below:

Waters:

<u>Compound</u>	<u>Maximum Concentration</u>
acetone	10 ug/L

Associated Samples: All

An action level of ten times the maximum amount of this common contaminant was used to evaluate the data.

Blank Actions:

- Value < CRQL; report CRQL followed by a U.
- Value > CRQL and < action level; report value followed by a U.
- Value > CRQL and > action level; report value unqualified.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Volatiles

The matrix spike/matrix spike duplicate (MS/MSD) Percent Recovery (%R) for trichloroethene exceeded the lower quality control limit. No action was taken however, since the positive results reported in the unspiked sample had been previously qualified for calibration noncompliance.

ADDITIONAL COMMENTS

Samples SC355XXT was diluted and reanalyzed due to acetone exceeding the instrument's linear calibration range. The dilution result for this compound was transposed over to the initial analysis result which was annotated as such, and used in the validation.

No other problems were encountered in this case.

C-49-4-2-162
MR. RICH NINESTEEL
APRIL 16, 1992
PAGE SIX

ROCKY FLATS SITE
CASE NO. SLCR3, SDG PKG 3

TABLE 1 - QUALIFICATION SUMMARY

Sample No.	Volatile	Semivolatile
SC355XXTTW	J ³	
SC355XXTF	J ³	
SC355XXTB	J ³	
SC41408MF	J ³	
SC41408MB	J ^{6,3}	
SC424XXTF	J ^{6,3}	
SC445XXTB	J ^{6,3}	
SC31XXXXT	A ¹ , J ^{2,5}	
SC325XXT	A ¹ , J ^{2,5}	
SC33XXXXT	A ¹ , J ^{2,5}	
SC31XXXTT	J ³	
SC34XXXXT	A ¹ , J ^{2,5}	
SC355XXT	J ^{1,2,5}	
SC36408T	J ^{1,2,5}	
SC37408T	J ^{1,2,5}	
SC37408TD	J ^{1,2,5}	
SC38408T	A ¹ , J ^{6,9}	
SC39408T	J ^{1,6,9}	
SC40408T	A ¹ , J ^{6,9}	
SC41408M	A ¹ , J ^{6,9}	
SC41408MD	A ¹ , J ^{6,9}	
SC424XXT	A ¹ , J ⁴	
SC435XXT	A ¹ , J ^{4,8}	
SC435XXTD	A ¹ , J ^{4,8}	
SC445XXT	A ¹ , J ^{4,8}	

A¹ - Change positive result for acetone to a revised detection limit because of blank contamination.

J¹ - Estimate "J" positive results for acetone due to %RSD > 30%.

J² - Estimate "J" positive results and nondetects for 4-methyl-2-pentanone due to %D > 50%.

J³ - Estimate "UJ" nondetects for 4-methyl-2-pentanone and carbon disulfide due to %D > 50%.

C-49-4-2-162
MR. RICH NINESTEEL
APRIL 16, 1992
PAGE SEVEN

- J⁴ - Estimate "J", positive results and "UJ" nondetects for tetrachloroethene due to %D > 50%.
- J⁵ - Estimate "UJ" nondetects for 2-butanone due to %D > 50%.
- J⁶ - Estimate "UJ" nondetects for trichloroethene due to %D > 50%.
- J⁷ - Estimate "J" positive results for acetone due to %D > 25%.
- J⁸ - Estimate "J" positive results for 1,1,1-trichloroethane due to %D > 25%.
- J⁹ - Estimate "J" positive results for 2-butanone due to %D > 25%.



INTERNAL CORRESPONDENCE

C-49-4-2-223

TO: RICH NINESTEEL

DATE: APRIL 23, 1992

FROM: RICKY DEPAUL

COPIES: D. A. SCHEIB

SUBJECT: ORGANIC DATA VALIDATION - VOA/BNAs
ROCKY FLATS
CASE NO. SLCR4, SDG PKG4

SAMPLES:

Volatiles:

17/soil/SC- 455XX-H, 455XX-H-D, 465XX-H, 475XX-H,
485XX-H, 495XX-H, 505XX-H, 515XX-H,
525XX-H, 535XX-H, 545XX-H, 555XX-H,
565XX-H, 574-08-M, 584-08-M, 595XX-M,
605XX-M

5/aqueous/SC- 485XX-H-F, 485XX-H-B, 465XX-H-T-W,
455XX-H-T, 595XX-M-T

Semivolatiles:

17/soil/SC- 455XX-H, 455XX-H-D, 465XX-H, 475XX-H,
485XX-H, 495XX-H, 505XX-H, 515XX-H,
525XX-H, 535XX-H, 545XX-H, 555XX-H,
565XX-H, 574-08-M, 584-08-M, 595XX-M,
605XX-M

2/aqueous/SC- 485XX-H-F, 485XX-H-B

A validation was performed on the organic analytical data from the volatile and semivolatile fraction analyses of Case No. SLCR4, SDG PKG 4, low level soil and aqueous samples collected by EG&G Idaho Inc. on 1/27/92, 1/28/92 and 1/30/92 at the Rocky Flats site. Three trip blanks, one field blank and one rinsate blank were included with this analytical set. Additionally, one field duplicate pair was designated for both volatile and semivolatile analyses. The data were reviewed with reference to the EPA "Functional Guidelines for Evaluating Organic Analyses", as applied for use within Region VIII, and were evaluated based on the following parameters:

- * • Data Completeness
- * • Holding Times
- * • GC/MS Tuning

C-49-4-2-223
Mr. Rich Ninesteel
April 23, 1992
Page Two

- Calibrations
- Blanks
- * ● Surrogate Spike Recoveries
- * ● Internal Standards Performance
- * ● Matrix Spike Analyses
- * ● Field Duplicate Precision
- * ● Compound Identification
- * ● Compound Quantitation

* - All quality control criteria were met for this parameter.

The attached Table 1 summarizes the validation qualifications which were based on the following information:

HOLDING TIMES

Semivolatiles

Sample SC-455XX-H was extracted outside of the 7-day maximum holding time until extraction allowance for soil samples. Only nondetected sample results were reported for this sample and these are qualified as estimated, "UJ".

CALIBRATIONS

The following tables summarize calibration non-compliances and corresponding actions. The key associated with these tables is presented on page four of this memorandum.

Volatiles

<u>Compound</u>	IC		
acetone	<u>12/28/91</u>	X	
Associated Samples:	SC-455XX-H	SC-505XX-H	SC-565XX-H
	SC-455XX-H-D	SC-515XX-H	SC-574-08M
	SC-465XX-H	SC-525XX-H	SC-584-08M
	SC-475XX-H	SC-535XX-H	SC-595XX-M
	SC-485XX-H	SC-545XX-H	SC-605XX-M
	SC-495XX-H	SC-555XX-H	

No actions were taken for the above affected samples because all acetone results were either nondetects or positive results qualified due to blank contamination.

C-49-4-2-223
Mr. Rich Ninesteel
April 23, 1992
Page Three

<u>Compound</u>	<u>CC 01/31/92</u>	<u>CC 02/01/92</u>	<u>CC 02/04/92</u>
acetone	XX	X	X
carbon disulfide	X	X	X
carbon tetrachloride	X	X	
trichloroethene		XX	
1,1,2-trichloroethane		X	
4-methyl-2-pentanone			XX
tetrachloroethene			X
Associated Samples:	SC-455XX-H SC-455XX-H-D SC-465XX-H SC-475XX-H SC-485XX-H SC-495XX-H	SC-505XX-H SC-515XX-H SC-525XX-H SC-535XX-H SC-545XX-H SC-555XX-H SC-565XX-H SC-574-08M SC-584-08M SC-595XX-M SC-605XX-M	SC-455XX-H-T SC-465XX-H-T-W SC-485XX-H-F SC-595XX-M-T SC-485XX-H-B

Nondetects reported for 4-methyl-2-pentanone and trichloroethene in affected samples are qualified as estimated, "UJ". No qualifications were made for any of the above other compounds listed, as only positive results qualified due to blank contamination or nondetects were reported for these compounds in the associated samples.

Semivolatiles

<u>Compound</u>	<u>CC 02/14/92</u>	<u>CC 02/15/92</u>
2,4-di-nitrotoluene	X	
pyrene	X	
cyclohexanone	X	
n-nitroso-di-n-propylamine		X
cyclohexanone		X
Associated Samples:	SC-485XX-H-F SC-485XX-H-B SC-455XX-H SC-455XX-H-D SC-465XX-H SC-475XX-H	SC-495XX-H, SC-555XX-H SC-505XX-H, SC-565XX-H SC-515XX-H, SC-574-08M SC-525XX-H, SC-584-08M SC-535XX-H, SC-595XX-M SC-545XX-H, SC-605XX-M SC-485XX-H

C-49-4-2-223
Mr. Rich Ninesteel
April 23, 1992
Page Four

Only nondetects were reported for the above compounds in the associated samples, therefore, no actions are required.

Calibration Key:

- X - Percent RSD > 30; percent D > 25; Estimate (J) positive results.
XX - Percent RSD > 50; percent D > 50; Estimate (J) positive results and estimate (UJ) nondetects.

BLANKS

Volatiles

The following contaminants were detected in the laboratory method blank analyses in the maximum amounts indicated below:

<u>Compound</u>	<u>Maximum Concentration</u>
methylene chloride	4 ug/kg
acetone	14 ug/kg

Associated Samples: All

Action levels of ten times the maximum amount of these common contaminants were used to evaluate the data. Additionally, sample weight, moisture content and dilution factors were considered prior to the application of all action levels.

Blank Actions:

- o Value < CRQL; report CRQL followed by a U.
- o Value > CRQL and < action level; report value followed by a U.
- o Value > CRQL and > action level; report value unqualified.

No other problems were encountered in this case.

ADDITIONAL COMMENTS

Laboratory reanalysis of sample SC-595XX-M was performed due to an elevated baseline in the chromatogram. However, the reanalysis also shows a similar baseline elevation. Acetone was the only target compound quantitated using this data. In the professional judgement of the validator, the initial analysis provides accurate quantitation of this target analyte and this data was evaluated and incorporated into this memorandum.

Positive sample results for compounds less than the CRQL are qualified as estimated, "J".

C-49-4-2-223
Mr. Rich Ninesteel
April 23, 1992
Page Five

OVERALL ASSESSMENT

All data are accepted with minor problems qualified.

Attachments:

1. Appendix A - Qualified Analytical Results.
2. Appendix B - Support Documentation.

ROCKY FLATS SITE
CASE NO. SLCR4, SDG PKG4

TABLE 1 - QUALIFICATION SUMMARY

Sample No.	Volatile	Semivolatile
SC-455XX-H	A ¹	J ³
SC-455XX-H-D	A ¹	
SC-465XX-H	A ¹	
SC-475XX-H	A ¹ , J ⁴	
SC-485XX-H	A ¹	
SC-495XX-H	A ¹	
SC-505XX-H	A ^{1,2} , J ¹	
SC-515XX-H	A ^{1,2} , J ¹	
SC-525XX-H	A ¹ J ^{1,4}	
SC-535XX-H	A ¹ J ¹	
SC-545XX-H	A ¹ J ^{1,4}	
SC-555XX-H	A ¹ J ¹	
SC-565XX-H	A ¹ J ^{1,4}	
SC-574-08-M	A ¹ J ¹	
SC-584-08-M	A ¹ J ¹	
SC-595XX-M	A ¹ J ¹	
SC-605XX-M	A ¹ J ^{1,4}	
SC-485XX-H-B	A ¹ J ²	
SC-455XX-H-T		J ²
SC-465XX-H-T-W		J ²
SC-485XX-H-F	A ¹ J ²	
SC-595XX-MT		J ²

A¹ - Change positive result for acetone to a revised detection limit because of blank contamination.

A² - Change positive result for methylene chloride to a revised detection limit because of blank contamination.

J¹ - Estimate "UJ" nondetects for trichloroethene because %D for CCV > 50%.

J² - Estimate "UJ" nondetects for 4-methyl-2-pentanone because %D for CCV > 50%.

J³ - Estimate "UJ" nondetects because of holding time until extraction exceedance.

J⁴ - Estimate "J" positive sample results for compounds less than the CRQL.



INTERNAL CORRESPONDENCE

C-49-4-2-134

TO: RICH NINESTEEL

DATE: APRIL 28, 1992

FROM: KENT E. WEAVER

COPIES: D. A. SCHEIB

SUBJECT: INORGANIC DATA VALIDATION
ROCKY FLATS
CASE NO. SLCR1, SDG PKG1

TAL Metals:

15/soils/SC-01408-M	SC-02408-T	SC-03408-T
SC-04408-T	SC-05410-T	SC-06410-T
SC-07408-T	SC-08408-T	SC-09408-T
SC-10408-T	SC-11408-T	SC-12408-T
SC-13408-T	SC-14408-T	SC-03408-TD

A validation was performed on the inorganic analytical data from Case No. SLCR1, SDG PKG1, soil samples collected by HALLIBURTON NUS Environmental Corporation at the Rocky Flats site. The data were reviewed with reference to the EPA "Functional Guidelines for Evaluating Inorganic Analyses" as applied for use within USEPA Region VIII, and were evaluated based on the following parameters:

- * • Data Completeness
- * • Holding Times
- * • Calibration Verification
- Laboratory Blank Analyses
- * • Interference Check Sample Results
- Matrix Spike Recoveries
- Laboratory Control Standard and Duplicate Results
- ICP Serial Dilution Results
- * • Field duplicate precision
- * • Detection Limits
- * • Sample Quantitation

* - All quality control criteria were met for this parameter.

The attached Table 1 summarizes the validation recommendations which were based on the following information:

C-49-4-2-134
Mr. Rich Ninesteel
April 28, 1992
Page Two

Blanks

No field quality control blanks were included with this sample set. Laboratory method blank analyses yielded the following contaminants in the maximum concentrations indicated:

<u>Contaminant</u>	<u>Maximum Concentration</u> (mg/kg)	<u>Action Level</u> (mg/kg)
calcium	236.5	1182.5
iron	7.9	39.5
magnesium	12.4	62.0
potassium	451.0	2255.0
silver	4.0	20.0
sodium	273.0	1365.0

Samples Affected: All

Blank Actions

Value > IDL and < Action Level = Report value U.
Value > IDL and > Action Level = Report value unqualified.

Individual sample size and dilution factors were considered prior to the application of all action levels. No actions were taken for calcium, iron, magnesium, potassium, and sodium because all sample concentrations for these analytes were greater than the action level.

Matrix Spike Recoveries

The Matrix Spike (MS) Percent Recovery %Rs for magnesium was below 30%. Only positive results were reported for this analyte and these are qualified as estimated, "J".

The MS %R for lead exceeded the upper quality control limit. Reported sample results for lead are qualified as estimated "J"; these results are biased high. The MS %R for selenium was less than the lower quality control limit but above 30%. Only nondetects are reported for this analyte, and these results have been qualified as estimated "UJ" in all samples.

C-49-4-2-134
Mr. Rich Ninesteel
April 28, 1992
Page Three

Laboratory Control Samples

The amount of selenium found in the laboratory control sample was below quality control limits. Nondetects for this compound have been qualified as estimated, "UJ". No positive results were reported.

ICP Serial Dilution Results

ICP Serial Dilution Percent Differences (%Ds) for several analytes exceeded the 10% quality control limit. Positive results for these analytes in the associated samples have been qualified as estimated, "J".

No other problems were noted.

Overall Assessment

The data are accepted for use as qualified. Several analytes were found as contaminants in laboratory method blanks. Nondetects for selenium were estimated due to a laboratory control sample non-compliance and low matrix spike recovery. Positive results for lead and magnesium were estimated due to non-compliant matrix spike recoveries. Some positive results for several analytes were estimated due to high serial dilution percent differences.

ROCKY FLATS
CASE NO. SLCR1, SDG PKG1

TABLE 1 - RECOMMENDATION SUMMARY

Aluminum	J ⁴	Magnesium	J ^{1,4}
Antimony		Manganese	
Arsenic		Mercury	
Barium	J ⁴	Nickel	
Beryllium		Potassium	J ⁴
Cadmium		Selenium	J ^{2,3}
Calcium	J ⁴	Silver	A ¹ J ⁴
Chromium		Sodium	J ⁴
Cobalt		Thallium	
Copper		Vanadium	
Iron	J ⁴	Zinc	
Lead	J ¹	Boron	J ⁴

If the field is left blank, the qualifier is A, accept all data.

- A¹ - Accept data, but raise sample detection limit (where appropriate) to a revised detection limit due to laboratory method blank contamination.
- J¹ - Estimate "J" positive results or "UJ" nondetects due to Matrix Spike %Rs outside of quality control limits.
- J² - Estimate "UJ" nondetects due to low matrix spike recovery.
- J³ - Estimate "UJ" nondetects due to a laboratory control sample non-compliance.
- J⁴ - Estimate "J" associated positive results due serial dilution %Ds > 10.



INTERNAL CORRESPONDENCE

C-49-4-2-151

TO: RICH NINESTEEL

DATE: APRIL 28, 1992

FROM: KENT E. WEAVER

COPIES: D. A. SCHEIB

SUBJECT: INORGANIC DATA VALIDATION
ROCKY FLATS
CASE NO. SLCR2, SDG PKG2

TAL Metals:

15/soils/SC-15408-T	SC-16408-T	SC-17408-T
SC-185XX-T	SC-195XX-T	SC-205XX-T
SC-215XX-T	SC-225XX-T	SC-23408-T
SC-24408-T	SC-25408-T	SC-26408-T
SC-275XX-T	SC-285XX-T	SC-29408-T
SC-30408-T		

2/waters/SC-14408-T-B SC-14408-T-F

A validation was performed on the inorganic analytical data from Case No. SLCR2, SDG PKG2, soil samples collected by HALLIBURTON NUS Environmental Corporation at the Rocky Flats site. The data were reviewed with reference to the EPA "Functional Guidelines for Evaluating Inorganic Analyses" as applied for use within USEPA Region VIII, and were evaluated based on the following parameters:

- * • Data Completeness
- * • Holding Times
- * • Calibration Verification
- * • Laboratory and Field Blank Analyses
- * • Interference Check Sample Results
- * • Matrix Spike Recoveries
- * • Laboratory Control Standard and Duplicate Results
- * • ICP Serial Dilution Results
- * • Detection Limits
- * • Sample Quantitation

* - All quality control criteria were met for this parameter.

The attached Table 1 summarizes the validation recommendations which were based on the following information:

C-49-4-2-151
Mr. Rich Ninesteel
April 28, 1992
Page Two

Blanks

Field and laboratory method blank analyses yielded the following contaminants in the maximum concentrations indicated:

<u>Contaminant</u>	<u>Maximum Concentration (ug/L)</u>	<u>Action Level (mg/kg)</u>
arsenic	61.0	61.0
boron	105.0	105.0
cadmium	5.0	5.0
calcium	620.0	620.0
iron	38.0	38.0
magnesium	37.0	37.0
silver	4.0	4.0
sodium	261.0	261.0

Samples Affected: All

Blank Actions

Value > IDL and < Action Level = Report value U.

Value > IDL and > Action Level = Report value unqualified.

Individual sample size and dilution factors were considered prior to the application of all action levels. No actions were taken for boron, iron, magnesium, and silver because all sample concentrations for these analytes were greater than the action level.

Matrix Spike Recoveries

The Matrix Spike (MS) %Rs for silver, cadmium, and magnesium were below the lower quality control limit. Positive results and nondetects for these analytes have been qualified as estimated, "J, UJ", in all samples.

Laboratory Control Samples

The amount of selenium found in the laboratory control sample was below the quality control limits. Nondetects for this compound have been qualified as estimated, "UJ", in all soil samples. No positive results were reported. The aqueous laboratory control sample has low %Rs for selenium and silver. Positive results and nondetects for these analytes have been qualified as estimated, "J, UJ" in the associated samples.

C-49-4-2-151
Mr. Rich Ninesteel
April 28, 1992
Page Three

ICP Serial Dilution Results

ICP Serial Dilution Percent Differences (%Ds) for several analytes exceeded the 10% quality control limit. Positive results for these analytes in the associated samples have been qualified as estimated, "J".

No other problems were noted.

Overall Assessment

The data are accepted for use as qualified. Several analytes were found as contaminants in laboratory method and field blanks. Positive results and/or nondetects for silver and selenium were estimated due to laboratory control sample non-compliances. Positive results for silver, cadmium, and magnesium were estimated due to non-compliant matrix spike recoveries. Some positive results for several analytes were estimated due to high serial dilution percent differences.

ROCKY FLATS
CASE NO. SLCR2, SDG PKG2

TABLE 1 - RECOMMENDATION SUMMARY

Aluminum	J ³	Magnesium	J ^{1,3}
Antimony		Manganese	
Arsenic	A ¹	Mercury	
Barium	J ³	Nickel	
Beryllium		Potassium	J ³
Cadmium	A ¹ J ¹	Selenium	J ²
Calcium	A ¹ J ³	Silver	J ^{1,2}
Chromium		Sodium	A ¹
Cobalt		Thallium	
Copper		Vanadium	
Iron	J ³	Zinc	
Lead		Boron	J ³

If the field is left blank, the qualifier is A, accept all data.

- A¹ - Accept data, but raise sample detection limit (where appropriate) to a revised detection limit due to laboratory method blank contamination.
- J¹ - Estimate "J" positive results or "UJ" nondetects due to Matrix Spike %Rs below quality control limits.
- J² - Estimate "J" positive results or "UJ" nondetects due to laboratory control sample non-compliances.
- J³ - Estimate "J" associated positive results due serial dilution %Ds > 10.



INTERNAL CORRESPONDENCE

C-49-4-2-179

TO: RICH NINESTEEL
FROM: DAVID A. YOST
SUBJECT: INORGANIC DATA VALIDATION
ROCKY FLATS
CASE NO. SLCR3, SDG PKG3

DATE: APRIL 16, 1992
COPIES: D. A. SCHEIB

TAL Metals:

17/soils/SC-31XXX-T (P187140)	SC-325XX-T (P187147)
SC-33XXX-T (P187154)	SC-34XXX-T (P187161)
SC-355XX-T (P187168)	SC-36408-T (P187175)
SC-37408-T-D (P187189)	SC-37408-T (P187182)
SC-38408-T (P187192)	SC-39408-T (P187199)
SC-40408-T (P187206)	SC-41408-M-D (P187220)
SC-41408-M (P187213)	SC-424XX-T (P187432)
SC-435XX-T-D (P187446)	SC-435XX-T (P187439)
SC-445XX-T (P187449)	
6/waters/SC-355XX-T-B (P187459)	SC-355XX-T-F (P187458)
SC-41408-M-B (P187461)	SC-41408-M-F (P187460)
SC-424XX-T-F (P187462)	SC-445XX-T-B (P187463)

A validation was performed on the inorganic analytical data from Case No. SLCR3, SDG PKG3, soil samples collected by EG&G, Idaho, Inc. at the Rocky Flats site. Three rinsate blanks and three field blanks were included with this analytical data set. Additionally, three field duplicate pairs were designated for analyses. The data were reviewed with reference to the EPA "Functional Guidelines for Evaluating Inorganic Analyses" as applied for use within USEPA Region VIII, and were evaluated based on the following parameters:

- * • Data Completeness
- * • Holding Times
- * • Calibrations
- Blanks
- * • Interference Check Sample Results
- Matrix Spike Recoveries
- Laboratory Duplicate Results
- Field Duplicate Results
- * • Laboratory Control Standard and Duplicate Results
- ICP Serial Dilution Results
- * • Detection Limits
- * • Sample Quantitation

* - All quality control criteria were met for this parameter.

The attached Table 1 summarizes the validation recommendations which were based on the following information:

C-49-4-2-179
Mr. Rich Ninesteel
April 16, 1992
Page Two

Blanks

Field and laboratory method blank analyses yielded the following contaminants in the maximum concentrations indicated:

<u>Contaminant</u>	<u>Maximum Concentration (ug/L)</u>	<u>Action Level (mg/kg)</u>
arsenic	73.0	36.5
boron	51.0	25.5
calcium	455.0	227.5
iron	24.0	12.0
lead	30.0	15.0
magnesium	55.0	27.5
silver	8.0	4.0
sodium	437.0	218.5

Samples Affected: All

Blank Actions

Value > IDL and < Action Level = Report value U.

Value > IDL and > Action Level = Report value unqualified.

Field quality control blanks were evaluated for blank contamination using the following maximum concentrations found in the laboratory method blanks:

<u>Contaminant</u>	<u>Maximum Concentration (ug/l)</u>
boron	11
calcium	67
sodium	114

Individual sample size, moisture content and dilution factors were considered prior to the application of all action levels. No actions were taken for boron, calcium, magnesium, and sodium because all positive sample results for these analytes were greater than the action level.

Matrix Spike Recoveries

The Matrix Spike (MS) percent recoveries (%Rs) for chromium and magnesium were < the 75% lower quality control limit, yet > 30%. Positive sample results and nondetects were reported for these analytes and these results are qualified as estimated, "J", and "UJ" respectively. The MS %Rs for aluminum was less than 30%. Positive sample results reported for this analyte are qualified as estimated, "J". Nondetects for aluminum are considered unreliable and are qualified, rejected, "R".

C-49-4-2-179
Mr. Rich Ninesteel
April 16, 1992
Page Three

Lab Duplicate Results

The Relative Percent Differences (RPDs) for arsenic and lead failed to meet the 35% quality control limit for soils. Positive and nondetected sample results were reported for these analytes and these results are qualified as estimated, "J", and "UJ" respectively.

ICP Serial Dilution Results

ICP Serial Dilution Percent Differences (%Ds) were greater than 10% when the undiluted sample concentrations exceeded $50 \times \text{IDL}$ for Ca, Fe, K and B. Only positive sample were reported for these analytes in the affected samples and these are qualified as estimated, "J".

Overall Assessment

The data are accepted for use as qualified. Several analytes were found as contaminants in laboratory method and field quality control blanks. Positive results for chromium and magnesium were estimated due to low matrix spike recoveries. Positive and nondetected sample results for mercury are estimated due to field duplicate imprecision. Positive and nondetected sample results for lead and arsenic are estimated due to laboratory duplicate imprecision. Positive and nondetected sample results for aluminum are estimated and rejected, respectively due to extremely low matrix spike recovery. Positive sample results for calcium, iron, potassium and boron are estimated due to serial dilution percent differences >10%. No other problems were encountered.

ROCKY FLATS
CASE NO. SLCR3, SDG PKG3

TABLE 1 - RECOMMENDATION SUMMARY

Aluminum	J ⁵	R ¹	Magnesium	J ¹
Antimony			Manganese	
Arsenic	A ¹	J ⁴	Mercury	J ³
Barium			Nickel	
Beryllium			Potassium	J ²
Cadmium			Selenium	
Calcium	A ¹	J ²	Silver	A ¹
Chromium	J ¹		Sodium	A ¹
Cobalt			Thallium	
Copper			Vanadium	
Iron	A ¹	J ²	Zinc	
Lead	A ¹	J ⁴	Boron	A ¹ J ²

If the field is left blank, the qualifier is A, accept all data.

- A¹ - Accept data, but raise sample detection limit (where appropriate) to a revised detection limit due to laboratory method blank contamination.
- J¹ - Estimate "J" positive and "UJ" nondetects results due to Matrix Spike %Rs < 75%, but > 30%.
- J² - Estimate "J" associated positive sample results in affected samples due to serial dilution %Ds > 10%.
- J³ - Estimate "J" positive and "UJ" nondetects due to field duplicate imprecision.
- J⁴ - Estimate "J" positive and "UJ" nondetects due to lab duplicate imprecision.
- J⁵ - Estimate "J" positive results due to extremely low (<30%) matrix spike recovery.
- R¹ - Reject nondetects due to extremely low matrix spike recovery.



HALLIBURTON NUS
Environmental Corporation

INTERNAL CORRESPONDENCE

C-49-4-2-210

TO: RICH NINESTEEL
FROM: DAVID A. YOST
SUBJECT: INORGANIC DATA VALIDATION
ROCKY FLATS
CASE NO. SLCR4, SDG PKG4

TAL Metals:

17/soils/SC-455XX-H-D -455XX-H
-465XX-H -475XX-H
-485XX-H -495XX-H
-505XX-H -515XX-H
-525XX-H -535XX-H
-545XX-H -555XX-H
-565XX-H -57408-M
-58408-M -595XX-M
-605XX-M

2/waters/SC-485XX-H-B -485XX-H-F

A validation was performed on the inorganic analytical data from Case No. SLCR4, SDG PKG4, soil samples collected by EG&G, Idaho, Inc. at the Rocky Flats site. The data were reviewed with reference to the EPA "Functional Guidelines for Evaluating Inorganic Analyses" as applied for use within USEPA Region VIII, and were evaluated based on the following parameters:

- Data Completeness
 - Holding Times
 - Calibrations
 - Blanks
 - Interference Check Sample Results
 - Matrix Spike Recoveries
 - Laboratory Control Standard and Duplicate Results
 - ICP Serial Dilution Results
 - Field duplicate precision
 - Detection Limits
 - Sample Quantitation

* - All quality control criteria were met for this parameter.

The attached Table 1 summarizes the validation recommendations which were based on the following information:

C-49-4-2-210
Mr. Rich Ninesteel
April 22, 1992
Page Two

Calibrations

Some Continuing Calibration Verification (CCV) Percent Recoveries (%Rs) for potassium failed to meet the 90% lower quality control limit. Positive results for this analyte in all samples have been qualified as estimated, "J". No nondetects were reported.

Blanks

Field quality control and laboratory method blank analyses yielded the following contaminants in the maximum concentrations indicated:

<u>Contaminant</u>	<u>Maximum Concentration (ug/L)</u>	<u>Action Level (mg/kg)</u>
boron	118.0	59.0
calcium	913.0	456.5
chromium	12.0	6.0
lead	22.0	11.0
mercury	0.1	0.05
potassium	428.0	214.0
sodium	239.0	119.5

Samples Affected: All

Blank Actions

Value > IDL and < Action Level = Report value U.

Value > IDL and > Action Level = Report value unqualified.

Individual sample size and dilution factors were considered prior to the application of all action levels. No actions were taken for chromium, mercury and potassium because all sample concentrations for this analyte were greater than the action level.

Matrix Spike Recoveries

The Matrix Spike (MS) Percent Recoveries (%Rs) for cadmium, chromium, and magnesium, were below the lower quality control limit. Positive results and nondetects for these analytes have been qualified as estimated, "J", "UJ", respectively, in all samples.

C-49-4-2-210
Mr. Rich Ninesteel
April 22, 1992
Page Three

Laboratory Duplicate

The Relative Percent Difference (RPD) for boron exceeded the 35% quality control limits. Positive results for this analyte have been qualified as estimated, "J". No nondetect results were reported.

ICP Serial Dilution Results

ICP Serial Dilution Percent Differences (%Ds) for several analytes exceeded the 10% quality control limit. Positive results for these analytes in the associated samples have been qualified as estimated, "J".

Overall Assessment

The data are accepted for use as qualified. Positive results for potassium were estimated due to low continuing calibration verification percent recovery. Several analytes were found as contaminants in laboratory method blanks. Positive results and nondetects for cadmium, chromium and magnesium were estimated due to a low matrix spike recovery. Positive results for boron were estimated due to a laboratory duplicate sample non-compliance. Some positive results for several analytes were estimated due to high serial dilution percent differences. No other problems were encountered.

ROCKY FLATS
CASE NO. SLCR4, SDG PKG4

TABLE 1 - RECOMMENDATION SUMMARY

Aluminum	J ⁴	Magnesium	A ¹ J ^{1,4}
Antimony		Manganese	
Arsenic		Mercury	
Barium	J ⁴	Nickel	
Beryllium		Potassium	J ^{2,4}
Cadmium	J ¹	Selenium	
Calcium	A ¹ J ⁴	Silver	J ⁴
Chromium	J ^{1,4}	Sodium	A ¹ J ⁴
Cobalt		Thallium	
Copper		Vanadium	
Iron	A ¹ J ⁴	Zinc	
Lead	A ¹	Boron	A ¹ J ^{3,4}

If the field is left blank, the qualifier is A, accept all data.

- A¹ - Accept data, but raise sample detection limit (where appropriate) to a revised detection limit due to laboratory method blank contamination.
- J¹ - Estimate "J" positive results or "UJ" nondetects due to Matrix Spike %Rs outside of quality control limits.
- J² - Estimate "J" positive results due to low continuing calibration verification recovery.
- J³ - Estimate "J" positive results due to a laboratory duplicate RPD non-compliance.
- J⁴ - Estimate "J" associated positive results due serial dilution %Ds > 10.



INTERNAL CORRESPONDENCE

C-49-4-2-180

TO: RICH NINESTEEL
FROM: RICKY C. DEPAUL

DATE: APRIL 21, 1992
CC: D. A. SCHEIB

SUBJECT: INORGANIC DATA VALIDATION
ROCKY FLATS
CASE NO. SLC1A, SDG PKG1A

TCLP Metals:

13 waters/

SC-02408-T, SC-03408-T, SC-04408-T, SC-05410-T,
SC-06410-T, SC-07408-T, SC-08408-T, SC-09408-T,
SC-10408-T, SC-11408-T, SC-12408-T, SC-13408-T,
SC-14408-T

A validation was performed on the inorganic analytical data from Case No. SLC1A, SDG PKG1A, water samples collected by EG&G Rocky Flats Inc. at the Rocky Flats site. The data were reviewed with reference to the EPA "Functional Guidelines for Evaluating Inorganic Analyses" as applied for use within USEPA Region VIII, and were evaluated based on the following parameters:

- * o Data Completeness
- * o Holding Times
- * o Calibration Verification
- o Laboratory Blank Analyses
- * o ICP Interference Check Sample Results
- o Matrix Spike Recoveries
- * o Laboratory Control Sample Results
- o ICP Serial Dilution Results
- * o Detection Limits
- * o Sample Quantitation

* - All quality control criteria were met for this parameter.

The attached Table 1 summarizes the validation recommendations which were based on the following information:

Laboratory and/or field duplicates and CRDL Standard analyses were

C-49-4-2-180
Mr. Rich Ninesteel
April 21, 1992
Page Two

not included with this analytical data set; hence the data were not evaluated for these parameters.

Blanks

No field quality control blanks were included with this analytical data set. Laboratory method blank analyses yielded the following contaminants in the maximum concentrations indicated:

<u>Analyte</u>	<u>Maximum Concentration</u> (ug/l)	<u>Action Level</u> (ug/l)
calcium	33.0	165
cadmium	5.0	25.0
iron	10.0	50.0
magnesium	26.0	130
silver	4.0	20.0

Sample Affected: All

Blank Actions:

Value > IDL and < Action Level = Report value U.

Value > IDL and > Action Level = Report value unqualified.

Individual sample size and dilution factors were considered prior to the application of all actions levels. No actions were taken for calcium because all sample concentrations for this analyte are above the action level.

Matrix Spike Recoveries

The Matrix Spike (MS) Percent Recoveries (%Rs) for barium and silver were < 75%, yet > 30%. Only positive sample results were reported for barium and these results are qualified as estimated, "J". Positive results and nondetects for silver are qualified as estimated, "J" and "UJ", respectively.

ICP Serial Dilution Results

The Serial Dilution Percent Differences (%Ds) for barium, magnesium and calcium were greater than 10% when the undiluted sample concentrations were > 50X IDL. Positive sample results for these analytes, not qualified due to blank contamination, are qualified as estimated, "J" in the affected samples.

C-49-4-2-180
Mr. Rich Ninesteel
April 21, 1992
Page Three

Overall Assessment of the Data

The data are acceptable for use as qualified. Several analytes were found as contaminants in the laboratory method blanks. Positive and nondetected sample results for silver and barium are estimated due matrix spike recoveries less than 75%, but greater than 30%. Positive results for barium, magnesium and calcium are estimated in the affected samples due to ICP serial dilution percent differences greater than 10%. No other problems were encountered.

ROCKY FLATS
CASE NO. SLC1A, SDG PKG1A

TABLE 1 - RECOMMENDATION SUMMARY

Aluminum		Magnesium	A ¹ , J ²
Antimony		Manganese	
Arsenic		Mercury	
Barium	J ^{1,2}	Nickel	
Beryllium		Potassium	
Cadmium	A ¹	Selenium	
Calcium	J ²	Silver	A ¹ , J ¹
Chromium		Sodium	
Cobalt		Thallium	
Copper		Vanadium	
Iron	A ¹	Zinc	
Lead		Boron	

If the field is left blank, the qualifier is A - Accept all data.

- A¹ - Accept data, but raise sample detection limit (where appropriate) to a revised detection limit due to blank contamination.
- J¹ - Estimate (J) positive results and (UJ) nondetects due to matrix spike recoveries < 75%, yet > 30%.
- J² - Estimate (J) positive results in affected samples due to ICP serial dilution %Ds > 15 %.



INTERNAL CORRESPONDENCE

C-49-4-2-174

TO: RICH NINESTEEL
FROM: KAREN SABOLOSKY
SUBJECT: INORGANIC DATA VALIDATION - TCLP METALS
ROCKY FLATS
CASE NO. SLC2A, SDG PKG 2A

DATE: APRIL 20, 1992
CC: DEB SCHEIB

SAMPLES:

Inorganics:

16/aqueous/ SC-15408-T, SC-23408-T, SC-24408-T, SC-16408-T
SC-25408-T, SC-17408-T, SC-26408-T, SC-185XX-T
SC-275XX-T, SC-195XX-T, SC-285XX-T, SC-205XX-T
SC-29408-T, SC-215XX-T, SC-30408-T, SC-225XX-T

A validation was performed on the inorganic analytical data from Case No. SLC2A, SDG PKG 2A, soil samples collected by EG&G Idaho Inc., on 1/15/92 at the Rocky Flats site. The data were reviewed with reference to the EPA "Functional Guidelines for Evaluating Inorganic Analyses" as applied for use within Region VIII and were evaluated according to the following parameters:

- * • Data completeness
 - * • Holding times
 - * • Calibrations
 - Blanks
 - * • ICP interference check sample results
 - * • Laboratory control sample results
 - ICP serial dilution results
 - * • Detection limits
 - * • Sample quantitation
- * - All quality control criteria were met for this parameter.

The attached Table 1 summarizes the validation recommendations which were based on the following information:

Laboratory and/or field duplicates, matrix spike and CRDL Standard analyses were not performed for this analytical data set; hence the data were not evaluated for these parameters.

Blanks

Laboratory method blank /or TCLP preparation blank analyses yielded the following contaminants in the maximum concentrations indicated:

C-49-4-2-174
MR. RICH NINESTEEL
April 20, 1992
PAGE TWO

<u>Analyte</u>	<u>Maximum Concentration (ug/l)</u>	<u>Action Level (ug/l)</u>
Calcium	87	435
Iron	13	65

Samples affected: All samples

Blank Actions:

Value > IDL and < Action Level = Report Value U.

Value > IDL and > Action Level = Report value unqualified.

Dilution factors were considered prior to the application of all action levels. No actions were taken for calcium because all sample concentrations for this analyte are above the action level.

ICP Serial Dilution Results

Serial dilutions (%Ds) for barium were greater than 10% when the undiluted sample concentration was > 50 X IDL. Positive results for barium in the two affected samples are qualified as estimated, "J".

No other problems were encountered in this case.

Overall Assessment of the Data

The data are acceptable for use as qualified. Two analytes were found as contaminants in laboratory method and preparation blanks. Results for barium in some samples were estimated due to a serial dilution percent difference greater than 10%.

C-49-4-2-174
MR. RICH NINESTEEL
April 20, 1992
PAGE THREE

ROCKY FLATS SITE
CASE NO. SLC2A, SDG PKG 2A

TABLE 1 - RECOMMENDATION SUMMARY

Aluminum		Magnesium
Antimony		Manganese
Arsenic		Mercury
Barium	J ¹	Nickel
Beryllium		Potassium
Cadmium		Selenium
Calcium		Silver
Chromium		Sodium
Cobalt		Thallium
Copper		Vanadium
Iron	A ¹	Zinc
Lead		Boron

If the field is left blank, the qualifier is A - Accept all data.

- A¹ - Accept data, but raise sample detection limit (where appropriate) to a revised detection limit due to blank contamination.
- J¹ - Estimate "J" positive results for barium in affected samples due to ICP serial dilution %Ds > 10%.



INTERNAL CORRESPONDENCE

C-49-4-2-174

TO: RICH NINESTEEL

DATE: APRIL 29, 1992

FROM: KAREN SABOLOSKY

CC: DEB SCHEIB

SUBJECT: INORGANIC DATA VALIDATION - TCLP METALS
ROCKY FLATS
CASE NO. SLC3A, SDG PKG 3A

SAMPLES:

Inorganics:

14/aqueous/ SC-31XXX-T, SC-38408-T, SC-325XX-T, SC-39408-T,
SC-33XXX-T, SC-40408-T, SC-34XXX-T, SC-41408-T,
SC-355XX-T, SC-424XX-T, SC-36408-T, SC-435XX-T,
SC-37408-T, SC-445XX-T

A validation was performed on the inorganic analytical data from Case No. SLC3A, SDG PKG 3A, soil samples collected by EG&G Idaho Inc., on 1/20/92 and 1/21/92 at the Rocky Flats site. The data were reviewed with reference to the EPA "Functional Guidelines for Evaluating Inorganic Analyses" as applied for use within Region VIII and were evaluated according to the following parameters:

- * • Data completeness
 - * • Holding times
 - * • Calibrations
 - Blanks
 - * • ICP interference check sample results
 - * • Laboratory control sample results
 - Matrix spike results
 - ICP serial dilution results
 - * • Detection limits
 - * • Sample quantitation
- * - All quality control criteria were met for this parameter.

The attached Table 1 summarizes the validation recommendations which were based on the following information:

Laboratory and/or field duplicates and CRDL Standard analyses were not performed for this analytical data set; hence the data were not evaluated for these parameters.

Blanks

Laboratory method blank /or TCLP preparation blank analyses yielded the following contaminants in the maximum concentrations indicated:

C-49-4-2-174
MR. RICH NINESTEEL
APRIL 29, 1992
PAGE TWO

<u>Analyte</u>	<u>Maximum Concentration</u> (ug/l)	<u>Action Level</u> (ug/l)
Arsenic	73	365
Calcium	166	830
Iron	16	80

Samples affected: All

Blank Actions:

Value > IDL and < Action Level = Report Value U.

Value > IDL and > Action Level = Report value unqualified.

Dilution factors were considered prior to the application of all action levels. No actions were taken for calcium because all sample concentrations for this analyte are above the action level.

ICP Serial Dilution Results

The serial dilutions (%Ds) for magnesium, nickel, silver, iron, barium and calcium were greater than 10% when the undiluted sample concentrations were > 50 X IDL. Positive sample results for these analytes in affected samples are qualified as estimated, "J".

Matrix Spike

The Matrix Spike (MS) Percent Recoveries (%Rs) for barium, lead, selenium and silver were below the lower quality control limit, but > 30%. Positive results and nondetects reported for these analytes are qualified as estimated, "J", "UJ", respectively.

Overall Assessment of the Data

The data are acceptable for use as qualified. Three analytes were found as contaminants in the laboratory method and preparation blanks. Results for magnesium, nickel, silver, iron, barium and calcium in several samples were estimated due to serial dilution percent differences greater than 10%. Results for barium, lead, selenium and silver were estimated based on low matrix spike recoveries.

C-49-4-2-174
MR. RICH NINESTEEL
April 29, 1992
PAGE THREE

ROCKY FLATS SITE
CASE NO. SLC3A, SDG PKG 3A

TABLE 1 - RECOMMENDATION SUMMARY

Aluminum		Magnesium	J ¹
Antimony		Manganese	
Arsenic	A ¹	Mercury	
Barium	J ^{1,2}	Nickel	J ¹
Beryllium		Potassium	
Cadmium		Selenium	J ²
Calcium	J ¹	Silver	J ^{1,2}
Chromium		Sodium	
Cobalt		Thallium	
Copper		Vanadium	
Iron	A ¹ , J ¹	Zinc	
Lead	J ²	Boron	

If the field is left blank, the qualifier is A - Accept all data.

- A¹ - Accept data, but raise sample detection limit (where appropriate) to a revised detection limit due to blank contamination.
- J¹ - Estimate "J" positive results for magnesium, nickel, silver, iron, barium and calcium in affected samples due to ICP serial dilution %D > 10%.
- J² - Estimate "J" positive results and "UJ" nondetects due to matrix spike %R less than the quality control limit.



INTERNAL CORRESPONDENCE

C-49-5-2-4

TO: RICH NINESTEEL DATE: MAY 1, 1992
FROM: DWAYNE S. MOCK CC: D. A. SCHEIB
SUBJECT: INORGANIC DATA VALIDATION
ROCKY FLATS
CASE NO. SLCR4A, SDG PKG4A

Selected TCLP - Extracted TAL Metals:

16/waters/SC-

455XX-H, 465XX-H, 475XX-H, 485XX-H,
495XX-H, 505XX-H, 515XX-H, 525XX-H,
535XX-H, 545XX-H, 555XX-H, 565XX-H,
57408-M, 58408-H, 595XX-M, 605XX-H

A validation was performed on the inorganic analytical data from Case No. RFC2A, SDG PKG2A, water samples collected by HALLIBURTON NUS Environmental Corporation at the Rocky Flats site. The data were reviewed with reference to the EPA "Functional Guidelines for Evaluating Inorganic Analyses" as applied for use within Region VIII, and were evaluated based on the following parameters:

- * o Data Completeness
- * o Holding Times
- * o Calibration Verification
- o Laboratory Blank Analyses
- * o ICP Interference Check Sample Results
- o Matrix Spike Recoveries
- * o Laboratory Control Sample Results
- o ICP Serial Dilution Results
- * o Detection Limits
- * o Sample Quantitation

* - All quality control criteria were met for this parameter.

No laboratory duplicate analyses were included in this analytical data set, therefore the data was not evaluated for this parameter. Also, no field duplicate pair was included with this data set.

The attached Table 1 summarizes the validation recommendations which were based on the following information:

Blanks

No field quality control blanks were included with this analytical data set.

C-49-5-2-4
Mr. Rich Ninesteel
May 1, 1992
Page Two

Laboratory method blank analyses yielded the following contaminants in the maximum concentrations indicated:

<u>Analyte</u>	<u>Maximum Concentration (ug/l)</u>	<u>Action Level (ug/l)</u>
iron	54.0	270.0
silver	3.0	15.0
mercury	0.1	0.5
magnesium	33.0	165.0
lead	31.0	155.0
arsenic	60.0	300.0
calcium	64.0	320.0

Sample Affected: All

Blank Actions:

Value > IDL and < Action Level = Report value U.

Value > IDL and > Action Level = Report value unqualified.

Qualifications as indicated above were made for iron, mercury, magnesium, lead, and arsenic. No actions were taken for calcium because all calcium results are greater than the validation action level.

Matrix Spike Recoveries

Matrix Spike (MS) Percent Recoveries (%Rs) for arsenic and silver were extremely low (< 30%). Positive results for these analytes were qualified for blank contamination; nondetects are rejected, (R).

MS %Rs for barium and lead were below the 75% quality control limit (yet > 30%). Positive results (not qualified due to blank contamination) and nondetects for these analytes are qualified as estimated, (J) and (UJ), respectively.

ICP Serial Dilution Results

The ICP Serial Dilution Percent Difference (%D) for chromium in sample SC-475XX-H and calcium in sample SC-505XX-H exceeded the 10% quality control limit. The positive result for these analytes in these samples are qualified as estimated, (J).

C-49-5-2-4
Mr. Rich Ninesteel
May 1, 1992
Page Three

Overall Assessment of the Data

The data are acceptable for use as qualified except for any rejected data. Several analytes were detected as contaminants in the laboratory method blanks. Matrix spike recoveries for several analytes were noncompliant resulting in the rejection and/or estimation of associated sample data. Two analyte results were estimated due to noncompliant serial dilution analysis results. No other problems were encountered.

C-49-5-2-4

Mr. Rich Ninesteel
May 1, 1992
Page Four

ROCKY FLATS
CASE NO. RFC2A, SDG PKG2A

TABLE 1 - RECOMMENDATION SUMMARY

Aluminum		Iron	A ¹
Arsenic	A ¹ R ¹	Lead	A ¹ J ¹
Barium	J ¹	Mercury	A ¹
Cadmium		Nickel	
Calcium	J ²	Selenium	
Chromium	J ²	Silver	A ¹ , R ¹
Magnesium	A ¹		

If the field is left blank, the qualifier is A - Accept all data.

- A¹ - Accept data, but raise sample detection limit (where appropriate) to a revised detection limit due to blank contamination.
- J¹ - Estimate (J) positive results and (UJ) nondetects due to MS %R < 75% but > 30%.
- J² - Estimate (J) positive result for chromium in sample SC-475XX-H and calcium in sample SC-505XX-H because ICP Serial Dilution %Ds exceeded 10%.
- R¹ - Reject (R) nondetects in all samples due to extremely low MS recoveries.



HALLIBURTON NUS *Environmental Corporation*

INTERNAL CORRESPONDENCE

C-49-4-2-172

TO: MR. RICH NINESTEEL

DATE: APRIL 17, 1992

FROM: KELLY A. JOHNSON

COPIES: D.A.SCHEIB

**SUBJECT: MISCELLANEOUS DATA VALIDATION - LEACHATES
ROCKY FLATS
CASE NO. SLCR1, PKG. 1**

SAMPLES:

Miscellaneous/TCLP Leach/ASTM Leach:

14 soils/SC-02408-T, SC-03408-T, SC-03408-T-D,
SC-04408-T, SC-05410-T, SC-06410-T, SC-07408-T,
SC-08408-T, SC-09408-T, SC-10408-T, SC-11408-T,
SC-12408-T, SC-13408-T, SC-14408-T

PARAMETERS:

Miscellaneous

MISCELLANEOUS Alcohols, pH, Total Organic Carbon (TOC), Ammonia (N) Distillation, Bulk Density on Waste, Percent Moisture, Total Cyanide, Gross Alpha Screen, Gross Beta Screen, Free Swell Test, Amenable Cyanide

TCLP Leach

pH

ASTM Leach

Ortho Phosphorous (as P) , Turbidimetric Sulfate
(as SO₄) , Nitrate (as N) , Chloride (Cl) , Total
Dissolved Solids at 180 C (TDS) , Percent Recovery of
Solids after ASTM Leach

A validation was performed on various analytical data from the miscellaneous, TCLP leachate, and ASTM leachate analyses of Case No. SLCR1 PKG.1 of saltcrete soil samples collected by EG&G Rocky Flats Inc. on January 13-14, 1992 at the Rocky Flats site. One field duplicate pair was included with this analytical data set.

The data were reviewed with reference to the EPA "Functional Guidelines for Evaluating Organic Analyses" as applied for use within Region VIII and were evaluated based on the following parameters:

C-49-4-2-172
MR. RICH NINESTEEL
APRIL 17, 1992
PAGE TWO

- * ● Data Completeness
 - Holding Times
 - * ● Matrix Spike/Matrix Spike Duplicate
 - Field Duplicate Precision
- * - All quality control criteria were met for this parameter.

The attached Table 1 summarizes the validation qualifications which were based on the following information:

HOLDING TIMES

ASTM Leachate

The holding time for Total Dissolved Solids (TDS) analyses exceeded the maximum allowable holding time by 10 days for samples; SC-02408-T, SC-03408-T, SC-03408-T-D, SC-04408-T, SC-05410-T and 9 days for samples SC-06410-T, SC-07408-T, SC-08408-T, SC-09408-T, SC-10408-T, SC-11408-T, SC-12408-T, SC-13408-T, SC-14408-T. Only positive sample results were reported for this parameter and these results are qualified as estimated (J).

FIELD DUPLICATE PRECISION

Miscellaneous

The Relative Percent Difference (RPD) for the analysis of Gross Alpha Screen was high (in excess of 30%) for the field duplicate pair consisting of samples SC-03408-T and SC-03408-T-D. Only positive sample results were reported for this parameter and these results are qualified as estimated (J).

OVERALL ASSESSMENT

TDS results are qualified as estimated due to holding time exceedances. Gross Alpha Screen results are qualified as estimated due to field duplicate imprecision.

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Support Documentation

C-49-4-2-172
MR. RICH NINESTEEL
APRIL 17, 1992
PAGE THREE

ROCKY FLATS
SLCR1, PKG.1

TABLE 1 - QUALIFICATION SUMMARY

Alcohols.....	
pH.....	
(TOC).....	
Ammonia (N) Distillation.....	
Percent Moisture.....	
Total Cyanide.....	
Gross Alpha Screen.....	J ²
Gross Beta Screen.....	
Free Swell Test.....	
Amenable Cyanide.....	
TCLP pH.....	
Percent Recovery of Solids after ASTM Leach.....	
Ortho Phosphorous (as P).....	
Turbidimetric Sulfate (as SO ₄).....	
Nitrate (as N).....	
Chloride (Cl).....	
Bulk Density on Waste.....	
(TDS).....	J ¹

If the field is left blank, the qualifier is A - Accept all data.

J¹ - Estimate (J) positive results for TDS due to holding time exceedance.

J² - Estimate (J) positive results for gross alpha screen results due to field duplicate imprecision.



HALLIBURTON NUS *Environmental Corporation*

INTERNAL CORRESPONDENCE

C-49-5-2-49

TO: MR. RICH NINESTEEL **DATE:** MAY 7, 1992
FROM: KELLY A. JOHNSON KAJ **COPIES:** D.A.SCHEIB
SUBJECT: MISCELLANEOUS DATA VALIDATION - LEACHATES
ROCKY FLATS
CASE NO. SLCR2, PKG. 2

SAMPLES:

Miscellaneous/TCLP Leach/ASTM Leach:

19 soils/SC-15408-T, SC-16408-T, SC-17408-T,
SC-185XX-T, SC-195XX-T, SC-205XX-T, SC-215XX-T,
SC-225XX-T, SC-23408-T, SC-24408-T, SC-25408-T,
SC-26408-T, SC-275XX-T, SC-285XX-T, SC-29408-T,
SC-30408-T, SC-14408-T-B, SC-14408-T-F, SC-205XX-T(MS)

PARAMETERS:

Miscellaneous

Alcohols, pH, Total Organic Carbon (TOC),
Ammonia (N) Distillation, Bulk Density on Waste,
Percent Moisture, Total Cyanide, Gross Alpha
Screen, Gross Beta Screen, Free Swell Test,
Amenable Cyanide

TCLP Leach

pH

ASTM Leach

Ortho Phosphorous (as P) , Turbidimetric Sulfate
(as SO₄) , Nitrate (as N) , Chloride (Cl) , Total
Dissolved Solids at 180 C (TDS) , Percent Recovery of
Solids after ASTM Leach

A validation was performed on various analytical data from the miscellaneous, TCLP leachate, and ASTM leachate analyses of Case No. SLCR1 PKG.1 of 19 (including two field blanks) saltcrete soil samples collected by EG&G Rocky Flats Inc. on January 15-16, 1992 at the Rocky Flats site.

The data were reviewed with reference to the EPA "Functional Guidelines for Evaluating Organic Analyses" as applied for use within Region VIII and were evaluated based on the following parameters:

C-49-5-2-49
MR. RICH NINESTEEL
MAY 7, 1992
PAGE TWO

- * • Data Completeness
- Holding Times
- Field Blanks
- Matrix Spike/Matrix Spike Duplicate

* - All quality control criteria were met for this parameter.

The attached Table 1 summarizes the validation qualifications which were based on the following information:

HOLDING TIMES

ASTM Leachate

The holding time for ortho phosphate analyses exceeded the maximum allowable holding time by 17 days for samples; SC-15408-T, SC-16408-T, SC-17408-T, SC-185XX-T, SC-195XX-T, SC-15408-T-T, SC-14408-T-F and 16 days for samples SC-205XX-T, SC-215XX-T, SC-225XX-T, SC-23408-T, SC-24408-T, SC-25408-T, SC-26408-T, SC-275XX-T, SC-285XX-T, SC-29408-T, SC-30408-T, SC-205XX-T(MS). Positive and nondetected results are qualified as estimated (J) and (UJ), respectively.

BLANKS

The contaminants found in associated low level laboratory method and/or trip blanks analyses are summarized below:

Analyte	Maximum Concentration	Action Level
chloride	2 mg/L	2 mg/L
nitrate	0.2 mg/L	0.2 mg/L
total phosphorus	0.05 mg/L	0.05 mg/L
total iron	0.14 mg/L	0.14 mg/L

Samples Affected:

All low level samples

Blank Actions:

- o Value < CRQL; report CRQL followed by a U.
- o Value > CRQL and < action level; report value followed by a U.
- o Value > CRQL and > action level; report value unqualified.

C-49-5-2-49
MR. RICH NINESTEEL
MAY 7, 1992
PAGE THREE

The action levels were set using only the maximum concentrations of analytes found in field quality control blanks. No actions were taken for any of the analytes since no positive results were reported for them in any environmental samples.

MATRIX SPIKE RECOVERIES

Miscellaneous

Matrix Spike Percent Recoveries (%Rs) were reported by the laboratory to indicate matrix interferences for (TOC), but in the professional opinion of the data reviewer matrix spike recoveries of (71) and (72) will not adversely implicate the data. Therefore no qualifications were necessary.

However there was a %R for total cyanide that was excessively high (152%). Positive in all samples are affected and are qualified as estimated (J).

OVERALL ASSESSMENT

Ortho-phosphate results are qualified as estimated due holding time exceedances. Also total cyanide results are affected by high matrix spike %Rs and are qualified accordingly.

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Support Documentation

C-49-5-2-49
MR. RICH NINESTEEL
MAY 7, 1992
PAGE FOUR

ROCKY FLATS
SLCR2, PKG.2

TABLE 1 - QUALIFICATION SUMMARY

Alcohols	
pH	
(TOC)	
Ammonia (N) Distillation	
Percent Moisture	
Total Cyanide	J ²
Gross Alpha Screen	
Gross Beta Screen	
Free Swell Test	
Amenable Cyanide	
TCLP pH	
Percent Recovery of Solids after ASTM Leach	
Ortho Phosphorous (as P)	J ¹
Turbidimetric Sulfate (as SO ₄)	
Nitrate (as N)	
Chloride (Cl)	
Bulk Density on Waste	
(TDS)	

If the field is left blank, the qualifier is A - Accept all data.

J¹ - Estimate (J) positive results for Ortho-phosphate due to holding time exceedance.

J² - Estimate (J) positive results for total cyanide results due to high matrix spike %Rs.



INTERNAL CORRESPONDENCE

C-49-4-2-279

TO: RICH NINESTEEL

DATE: APRIL 30, 1992

FROM: KENT WEAVER

COPIES: D. A. SCHEIB

SUBJECT: MISCELLANEOUS DATA VALIDATION
ROCKY FLATS
CASE NO. SLCR3, SDG PKG3

SAMPLES: 17/sludges/

SC-31XXX-T	SC-325XX-T	SC-33XXX-T
SC-34XXX-T	SC-355XX-T	SC-36408-T
SC-37408-T	SC-37408-T-D	SC-38408-T
SC-39408-T	SC-40408-T	SC-41408-M
SC-41408-M-D	SC-424XX-T	SC-435XX-T
SC-435XX-T-D	SC-445XX-T	

6/waters/

SC-355XX-T-F	SC-355XX-T-B	SC-41408-M-F
SC-41408-M-B	SC-424XX-T-F	SC-445XX-T-B

A validation was performed on the miscellaneous analytical data from Case No. SLCR3, SDG PKG3, pond sludge samples collected by HALLIBURTON NUS Environmental Corporation at the Rocky Flats site. The samples were analyzed for alcohols, ammonia, chloride, total and amenable cyanide, gross alpha and beta screen, total organic carbon, percent moisture, ortho phosphorous, pH, sulfate, dissolved solids, nitrate, bulk density, and selected metals. The data were reviewed with reference to method-specific quality control criteria and the EPA "Functional Guidelines for Evaluating Inorganic Analyses" as applied for use within Region VIII as applicable. The data were evaluated based on the following parameters:

- * • Data Completeness
- * • Holding Times
- Blanks
- Matrix spike/matrix spike duplicate results
- * • Laboratory control sample recoveries
- * • Field duplicate precision
- * • Compound Quantitation

* - All quality control criteria were met for this parameter.

C-49-4-2-279
Mr. Rich Ninesteel
April 30, 1992
Page Two

The attached Table 1 summarizes the validation recommendations which were based on the following information:

BLANKS

Boron, calcium, sodium, and amenable cyanide were detected at very low levels in aqueous field quality control blanks. No qualifications were made because the positive results reported for these analytes were greater than five times the amount found in the blanks.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Matrix spike (MS) Percent Recoveries (%Rs) for chromium and magnesium exceeded the upper quality control limits. Positive results for these analytes in the selected metals samples are qualified as estimated "J".

An MS %R for ortho phosphorous was low (< 75%, but > 30%). The nondetect for this analyte in the associated sample has been qualified as estimated, "UJ".

An MS %R for total cyanide was high (> 125%). The positive result for this compound in the associated sample has been qualified as estimated, "J".

No other problems were encountered in this case.

OVERALL ASSESSMENT

The data are acceptable for use as qualified. Various sample data were estimated due non-compliant matrix spike recoveries.

C-49-4-2-279
Mr. Rich Ninesteel
April 30, 1992
Page Three

ROCKY FLATS
CASE NO. SLCR3, SDG PKG3

TABLE 1 - RECOMMENDATION SUMMARY

alcohols	
ammonia	
chloride	
amenable cyanide	
total cyanide	J ²
gross alpha and beta screen	
total organic carbon	
percent moisture	
ortho phosphorous	J ³
pH	
sulfate	
dissolved solids	
nitrate	
bulk density	
→ selected metals	J ¹
J ¹	- Estimate "J" positive results for chromium and magnesium in associated samples due to non-compliant MS recovery.
J ²	- Estimate "J" positive result in associated sample due to high MS recovery.
J ³	- Estimate "UJ" nondetect in associated sample due to low MS recovery.



INTERNAL CORRESPONDENCE

C-49-4-2-273

TO: RICH NINESTEEL

DATE: APRIL 29, 1992

FROM: KENT WEAVER

COPIES: D. A. SCHEIB

SUBJECT: MISCELLANEOUS DATA VALIDATION
ROCKY FLATS
CASE NO. SLCR4, SDG PKG4

SAMPLES: 17/sludges/

SC-455XX-H

SC-455XX-H-D

SC-465XX-H

SC-475XX-H

SC-485XX-H

SC-495XX-H

SC-505XX-H

SC-515XX-H

SC-525XX-H

SC-535XX-H

SC-545XX-H

SC-555XX-H

SC-565XX-H

SC-57408-M

SC-58408-M

SC-595XX-M

SC-605XX-M

2/water/

SC-485XX-H-F

SC-485XX-H-B

A validation was performed on the miscellaneous analytical data from Case No. SLCR4, SDG PKG4, pond sludge samples collected by HALLIBURTON NUS Environmental Corporation at the Rocky Flats site. The samples were analyzed for alcohols, ammonia, chloride, total and amenable cyanide, gross alpha and beta screen, total organic carbon, percent moisture, ortho phosphorous, pH, sulfate, dissolved solids, nitrate, bulk density, and selected metals. The data were reviewed with reference to method-specific quality control criteria and the EPA "Functional Guidelines for Evaluating Inorganic Analyses" as applied for use within Region VIII, as applicable. The data were evaluated based on the following parameters:

- * • Data Completeness
- * • Holding Times
- Blanks
- Matrix spike/matrix spike duplicate results
- * • Laboratory control sample recoveries
- Field duplicate precision
- * • Compound Quantitation

* - All quality control criteria were met for this parameter.

C-49-4-2-273
Mr. Rich Ninesteel
April 29, 1992
Page Two

The attached Table 1 summarizes the validation recommendations which were based on the following information:

BLANKS

Boron and sodium were detected at very low levels in an aqueous field quality control blank. No qualifications were made because the positive results reported for these analytes were greater than five times the amount found in the blank.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Matrix spike (MS) Percent Recoveries (%R) for cadmium, chromium, and magnesium exceeded the upper quality control limits. Positive results for these analytes in the selected metals sample are qualified as estimated "J".

An MS %R for ortho phosphorous was low (< 75%, but > 30%). The nondetect for this analyte in the associated sample has been qualified as estimated, "UJ".

An MS %R for chloride (0%) was low. The positive result for this compound in the associated sample has been qualified as estimated, "J".

FIELD DUPLICATE PRECISION

The Relative Percent Differences (RPDs) for the amenable cyanide and total cyanide results in the field duplicate pair (SC-455XX-H, SC-455XX-H-D) exceeded the 50% quality control limit for solid samples. Positive results for these analytes in the field duplicate pair have been qualified as estimated, "J".

No other problems were encountered in this case.

OVERALL ASSESSMENT

The data are acceptable for use as qualified. Various sample data were estimated due to field duplicate imprecision and non-compliant matrix spike recoveries.

C-49-4-2-273
Mr. Rich Ninesteel
April 29, 1992
Page Three

ROCKY FLATS
CASE NO. SLCR4, SDG PKG4

TABLE 1 - RECOMMENDATION SUMMARY

alcohols	
ammonia	
chloride	J ⁴
amenable cyanide	J ²
total cyanide	J ²
gross alpha and beta screen	
total organic carbon	
percent moisture	
ortho phosphorous	J ³
pH	
sulfate	
dissolved solids	
nitrate	
bulk density	
selected metals	J ¹
J ¹	- Estimate "J" positive results for cadmium, chromium, and magnesium in the total metals sample due to high MS recovery.
J ²	- Estimate "J" positive results in the field duplicate pair due to poor field duplicate precision.
J ³	- Estimate "UJ" nondetect in associated sample due to low MS recovery.
J ⁴	- Estimate "J" positive result in associated sample due to low MS recovery.

APPENDIX D
FIELD LOG BOOK

開羅地圖上標示 關閉了 埃及蘇伊士運河的關口。 (C0100)

1150

Work continued from Page

01-07-92 (cont)

1030 Crew preparing Permacon for break + lunch

1130 Terry Kojak arrives

1215 Crew suits up to enter Permacon

1250 Collect Field Blank PC-265XX-M-F

1255 Collect Vaseline blank PC-265XX-M-B

1345 Collect PC-275XX-M

Needed to hammer shelly debris into concrete
material appears very sticky

1415 Seal top container M00277. Crew cleaning up
preparing to exit Permacon and end shift

Place individual batches already collected into 100g cans
surrounded by Vermiculite. Place paint cans into refrigerator.

1530 2nd SHIFT ENTER TENT #10 - Don PRE

1545 2nd SHIFT ENTERED PERMACON TO CLEAN
MOISTURE METAL CONTAINER (FOR REMOVAL).

1606 REMOVE METAL CONTAINER M00277 FROM PERMACON

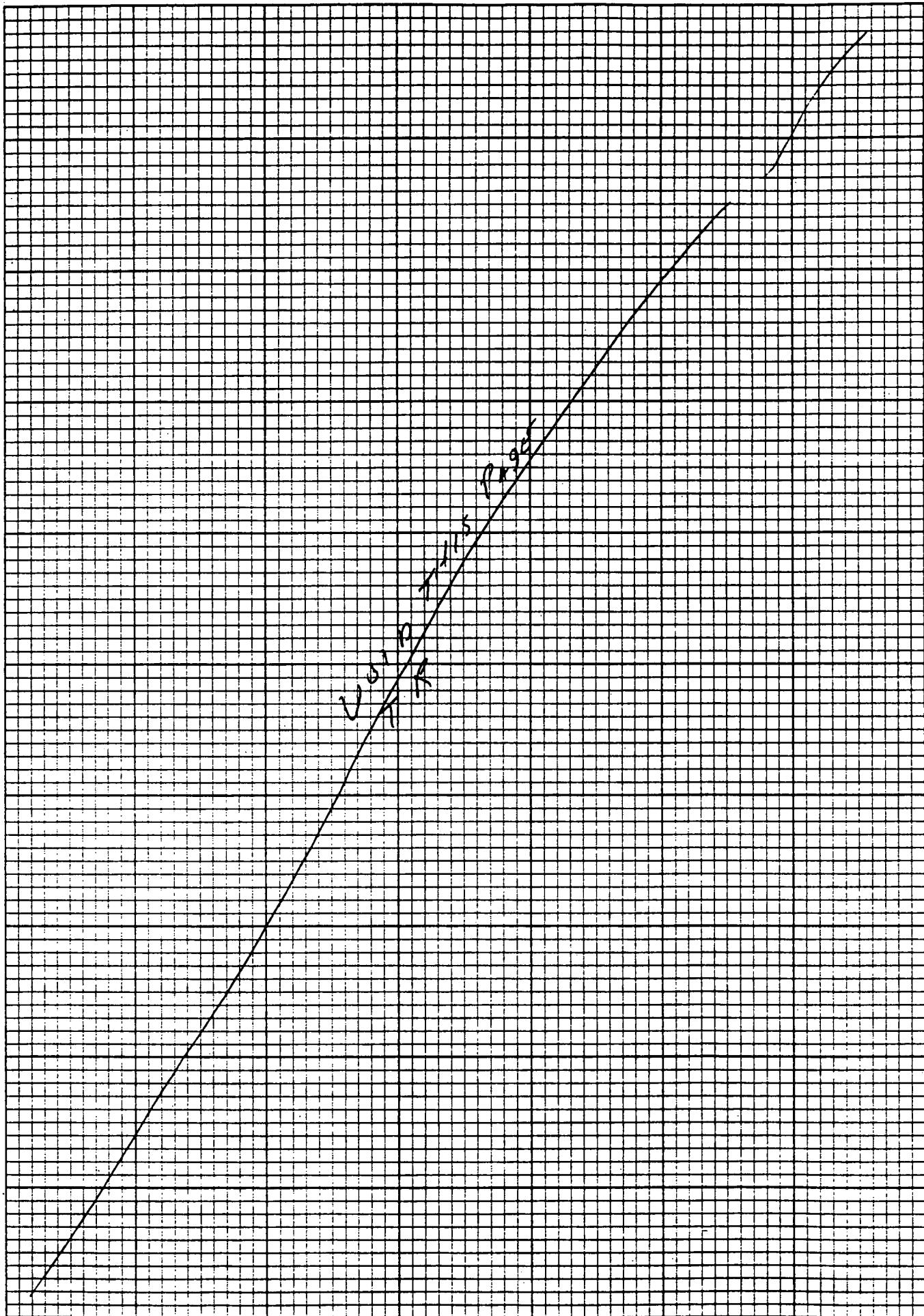
1616 PLACE TRIWALL IN PERMACON FOR SOFT FILTRATION & FREEZABILITY SAMPLE

1620 COLLECT (6) 1/2 gallon cans lined w/ zip lock bags
TRIWALL INFO. #09241 (SAMPLED prior to Christmas)
SAMPLE ID - PC-SOFT-T (FOR FILTRATION TEST)

SAMPLER R. Williams

1640 REMOVED TRIWALL #09241 FROM PERMACON

Work continued to Page



TITLE

PROJECT NO.

111

BOOK NO.

Work continued from Page

01-07-92 (Cont.)

- 1645 hrs - MOVED ^{MKT} Container M100818 BACK into PERMACON
to sample SALT/CRETE - TRIWALLS 748-04099
04011
TENT #8 PAD 904
STACK Q
- 1700 hrs - SC-01408-M - BEGAN collecting - TOOK SHELBY TUBE
with SLUG HAMMER - REMAINDER OF SAMPLE USED Mallet & trouser
MOLAL
- 1710 hrs - COLLECTED SC-SALT - M FOR FILTRATION TEST
from same triwall as SC-01408-M
- 1745 hrs - REMOVED a Container M100818 FROM PERMACON
- 1755 hrs - Personnel Exist PERMACON
- 1830 hrs - ALL PERSONNEL EXIST TENT #10

END

SIGNATURE

Tay Agat

DATE

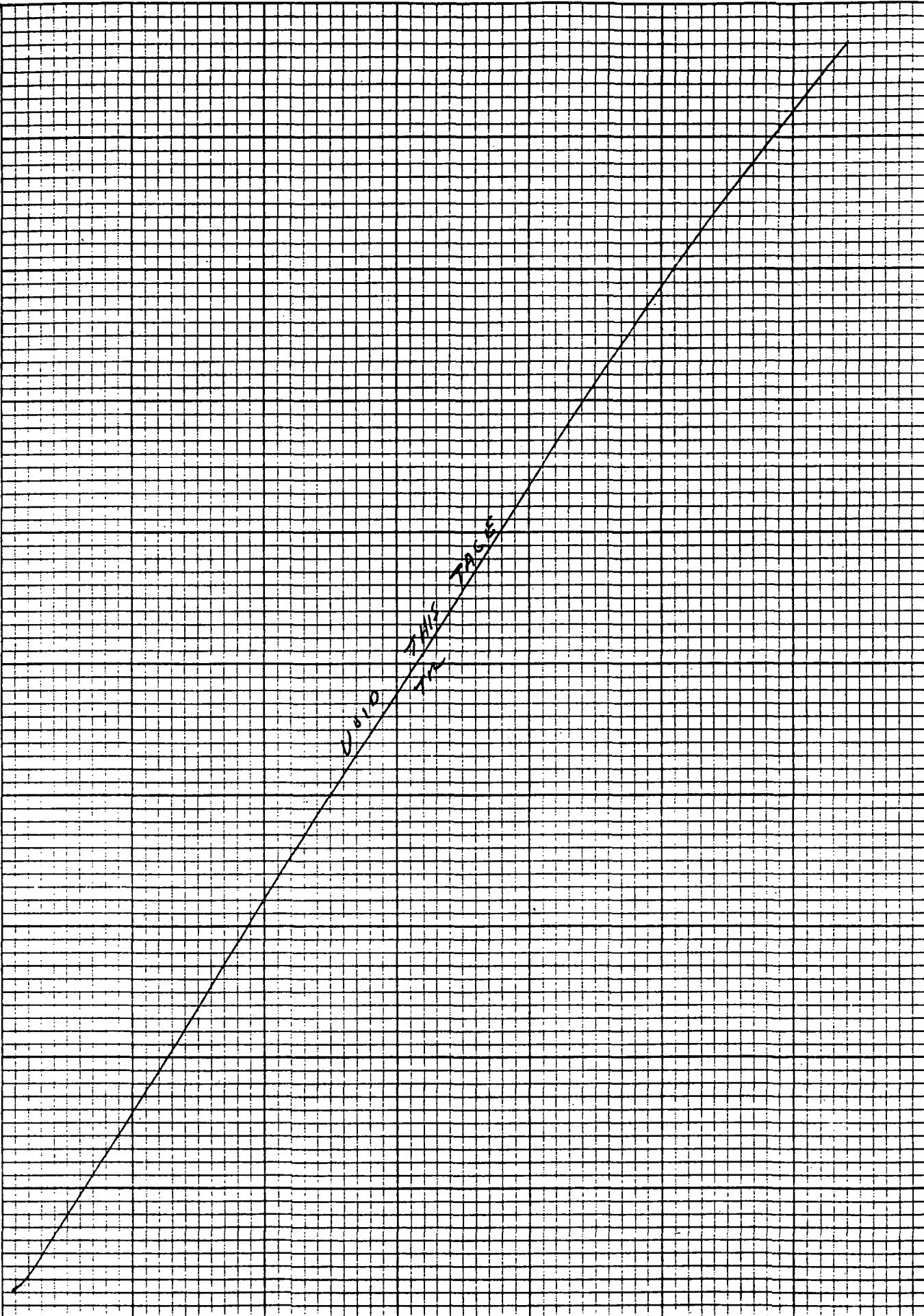
01-07-92

DISCLOSED TO AND UNDERSTOOD BY

DATE

WITNESS

DATE



Work continued from Page

1-8-92

0700 Lucy Basilio and Terry Mojaha arrive 9B4 buildings
Weather - 16° F windy

Foreman Jerry Ostreich sites safety needs.

Dean Pisor requests that HNUS put custody seals on
drums at 704? per. Dean to come out to 904 red later

0730 - Packaging samples - RAD & ENVIRONMENTAL (ENV. & 3RAD. C-OF-CS
FOR THIS DATE)
RAD-55gal Drum ID# D-78384 19500 D-78363 16400
D-78369 18500 D-78377 18500 CONTAINING
D-78368 19200 D-78327 20700 DAN TIN CANS
D-78327 20700 W/SAMPLES

ENVIRONMENT samples - ship in 2 coolers

0900-0910 - wt. Drums (see above)

0905-0930 Custody seal Drums

D-78384	63110B35	D-78363	63113B35
D-78369	63109B35	D-78377	63108B35
D-78368	63112B35	D-78327	63111B35

0935hrs - Packaging complete - left permanent will return ~1200
Go to HNUS office to pick up supplies

1200 L Basilio + T Mojaha onsite

1230 ENTER TENT A/I - SUPPLY INVENTORY

1300 CARPENTERS ARRIVE @ TENT A/I TO band Drums & coolers
to pallets

1333 CARPENTERS FINISH BANDING (2) pallets for shipping

1400 LOAD TRUCK @ TENT A/I to taxi to WAREHOUSE (BLDG #130)

1420 OFFLOAD PALLETS @ BLDG #130

1500 OMNI TRUCK UNLOADS SAMPLES - SEE BILL OF LADING #05928

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

Terry Mojaha

DATE

01-08-92

DISCLOSED TO AND UNDERSTOOD BY

DATE

WITNESS

DATE

110 MTS PAGE

TITLE

PROJECT NO.

115

01-08-92 (cont.)

BOOK NO.

Work continued from Page

1500 Dean Pivov requests that a HNUS worker call in morning to be escanled onto 750 rad ring to perform check of customs procedures for certain containers.

1520 Leave site for day

END

ENTRY
23

SCIENTIFIC BINDERY PRODUCTION CHICAGO 60605

Work continued to Page

SIGNATURE

Tony Royal

DATE

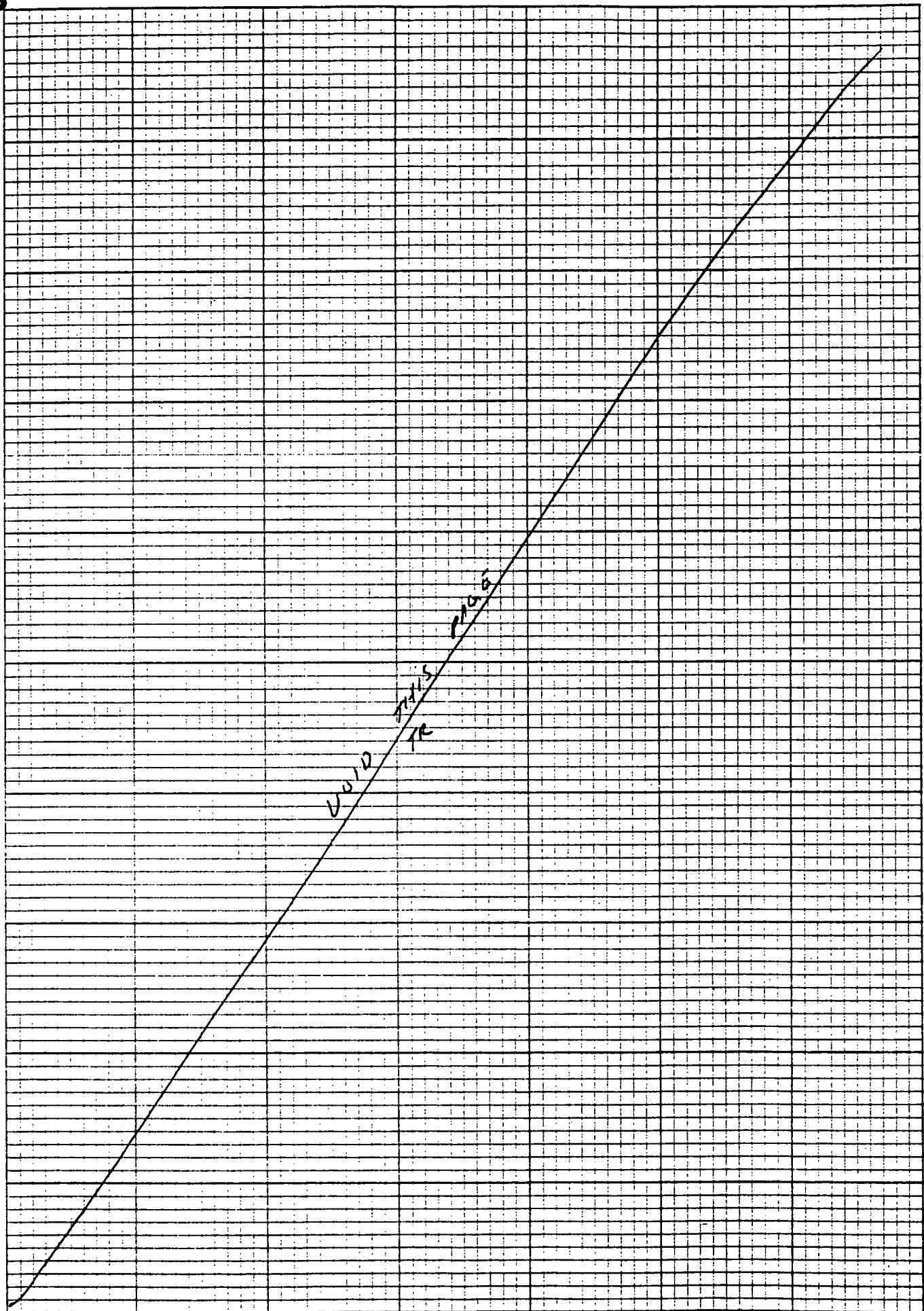
01-08-92

DISCLOSED TO AND UNDERSTOOD BY

DATE

WITNESS

DATE



TITLE

01-09-92

PROJECT NO.

BOOK NO.

117

Work continued from Page

- 0900-0905 - Sign in @ T-904A
 L. Basilio & T. Rosahn
- Carry in sample jars { 3 Boxes - 4 oz
 to Tent #10 } 9 Boxes - 32 oz
- T. Rosahn - REENTER TENT #10 to fill out sample labels
- L. Basilio - Called D. Pierson to perform chain
 of custody procedure on containers in PAD 750
 LEFT TENT #10 @ ~1000 hrs to meet w/ D. Pierson
- 1100 - T. Rosahn LEFT TENT #10 w/ EG&G Personnel to
 lunch break.
- 1135 - L. Basilio Returns to T-904A from PAD 750
 placed chain of custody seals on 21 drums that had
 loose bungs to allow for ventilation. Remove existing custody seal,
 tighten bungs, place new custody seal. Drum are silver &
 water samples from A + B pounds.
- 1145 L. Basilio + T. Rosahn leave for office
- 1325 C. Basilio + T. Rosahn return to site with
 additional sample bottles. Prepare sample labels
- 1500 Leave site. Obtain transfer papers to allow removal of
 cardboard box containing sampling paperwork to HANUS office

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

DATE

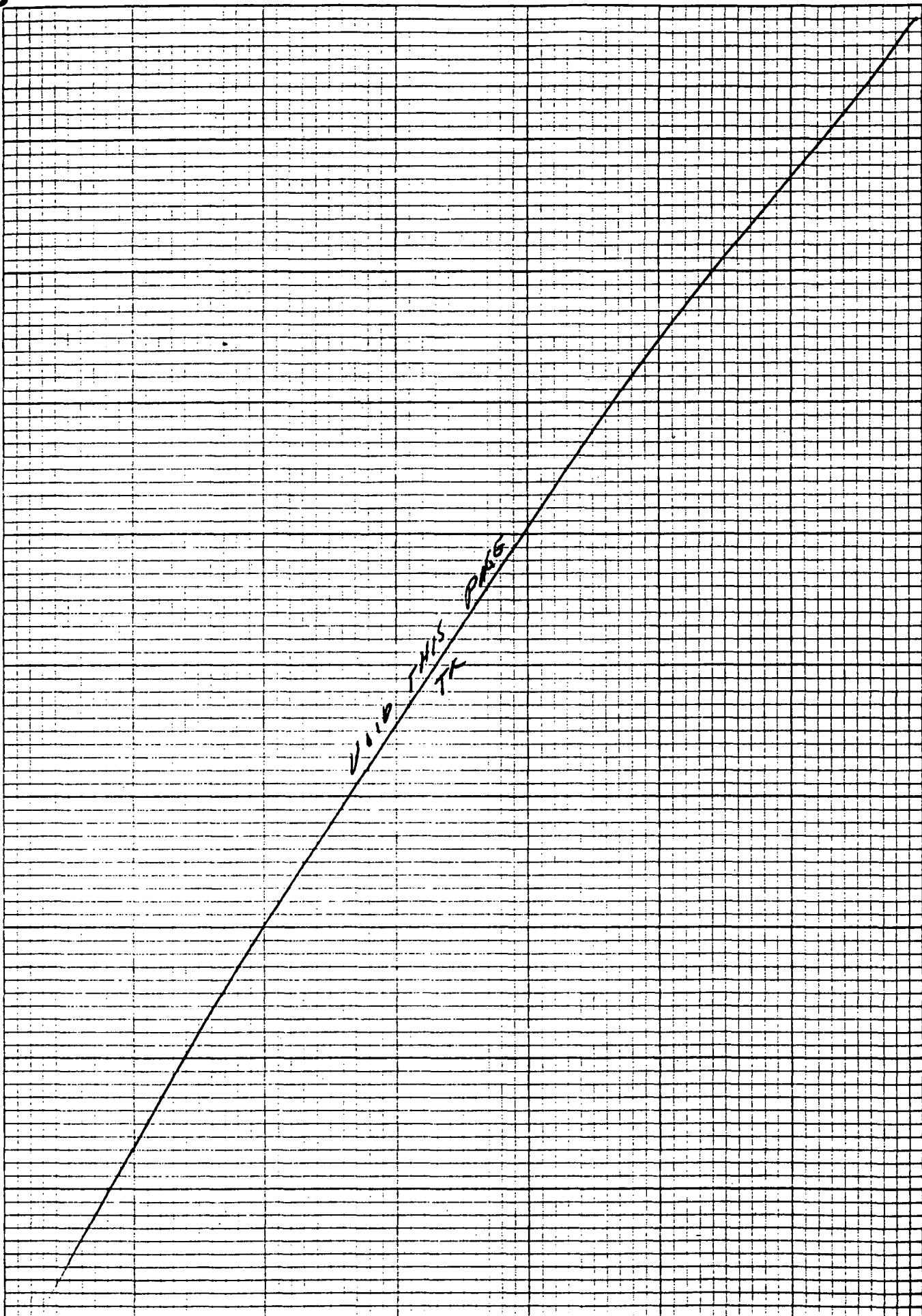
1-9-92

DISCLOSED TO AND UNDERSTOOD BY

DATE

WITNESS

DATE



ITLE

PROJECT NO.

119

1/13/92

BOOK NO.

Work continued from Page

0730 Larry Besilio on site. Heat in tent 10 went out over weekend. Need to wait to have tent heat up prior to starting work. Temp needs to be 60° F minimum. RPT instruments won't work at $< 60^{\circ}$ F

1100 L Basilio goes to obtain red picture badge. Tent is at proper temperature. Will begin sampling after crew lunch

1145 Crew starting up to enter Permeon and sample. Will be sampling Saltcrete Triwells

Triwell 03873 Tent 8
Stack G
sample in Bluff Red 904

1220 Crew enters Permeon

1228 - Triwell 03873 enters Permeon
- Terry Rojahn onsite - Holes

- Metrid eppigus gray, dry, hard
Use sledge hammer to pound shelly tube in triwell

1245 Prepare Trap Blank SC-02408-T-T

Use sledge hammer to collect shelly tube sample
Use hammer, chisel, and trowel to collect other sample

1300 Collect SC-02408-T

Crew puts composite sample into the composite drum for metals by accident instead of the triwell drum

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

L Basilio

DATE

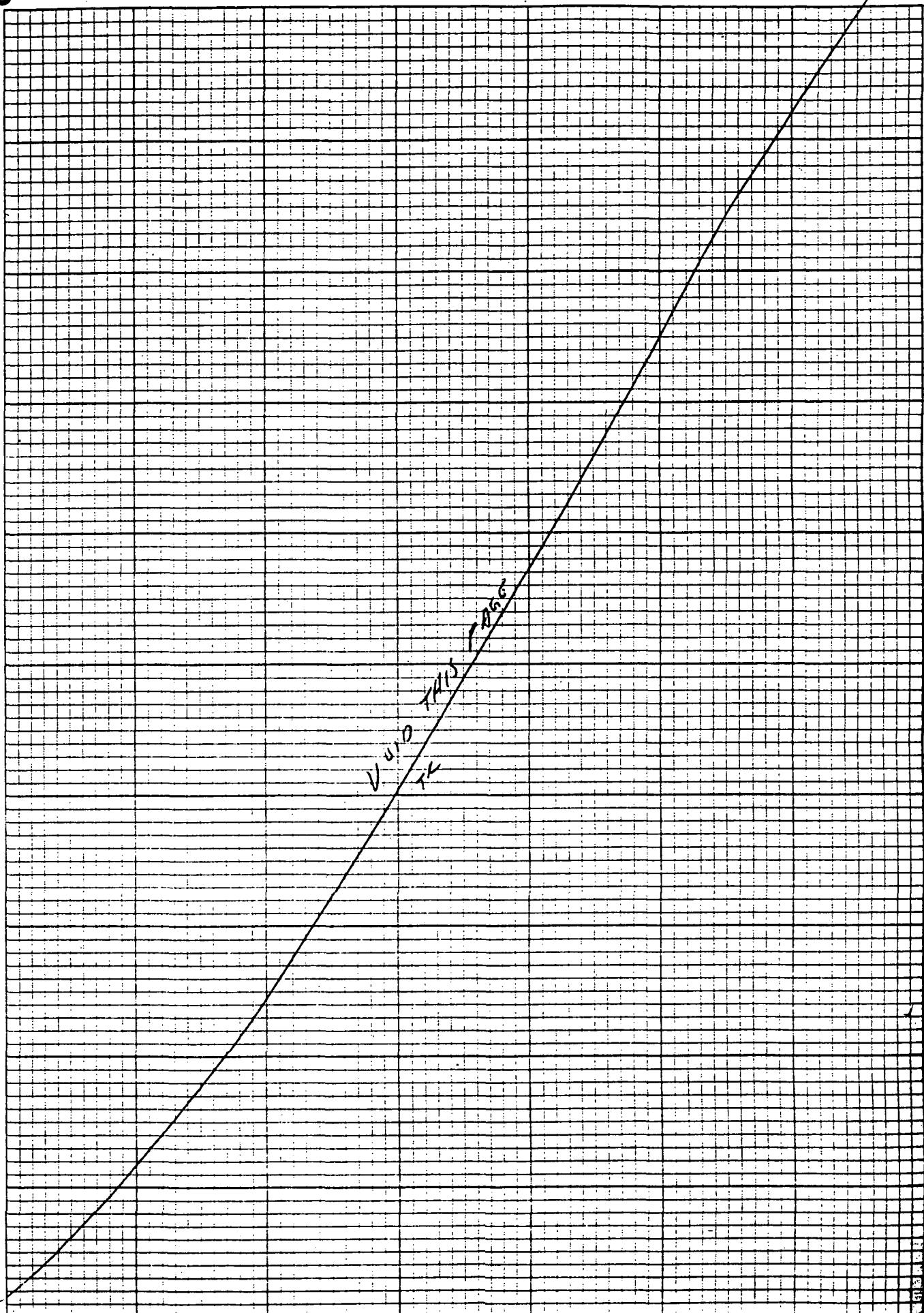
1/13/92

DISCLOSED TO AND UNDERSTOOD BY

DATE

WITNESS

DATE



TITLE

PROJECT NO.

121

01-13-97 (cont'd)

BOOK NO.

Work continued from Page

Collect another 1.6 gallons from triwall to place into correct composite drum.

1322 Remove Triwall #03873 from Permagum

New triwall 03912 Tent 8
Stack I Pad 904

1330 2nd Triwall enters Permagum

Crew departs Permagum for shift change

1550 - 2nd SHIFT ENTERS TENT #10 WORK AREA

- DON PPE - 5 EG&G Personnel
- Prepares to enter Permagum

1610 - EG&G Personnel ENTER Permagum

* 1615 - Start collecting SC-03408 - T & SC-03908 - T - D

FROM TRIWALL #03912. Material very hard but friable (like sand). SHELBY TUBE driven in w/ sledge hammer & extracted w/ fork lift. Remainder of sample collected w/ metal chisel & trowel. Also, tried using a Shelby tube. Shelby tube unsuccessful in collecting chemical parameters.

1650 - Put new liner on Triwall -

1656 - TAKE OUT TRIWALL #03912 &
PLACE NEW TRIWALL #03874

STACK & G PAD # 904 TENT # 8

* 1710 - Start Collecting SC-04408 - T FROM TRIWALL #03874.

SHELBY TUBE driven in w/ sledge hammer. Remainder of sample collected w/ trowel (material not as hard) used chisel & digger.

1740 - Removed Triwall #03874 from Permagum

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO IL
5 EG&G PERSONNEL OUT OF PERMAGUM Work continued to Page

SIGNATURE

Taylor

DISCLOSED TO AND UNDERSTOOD BY

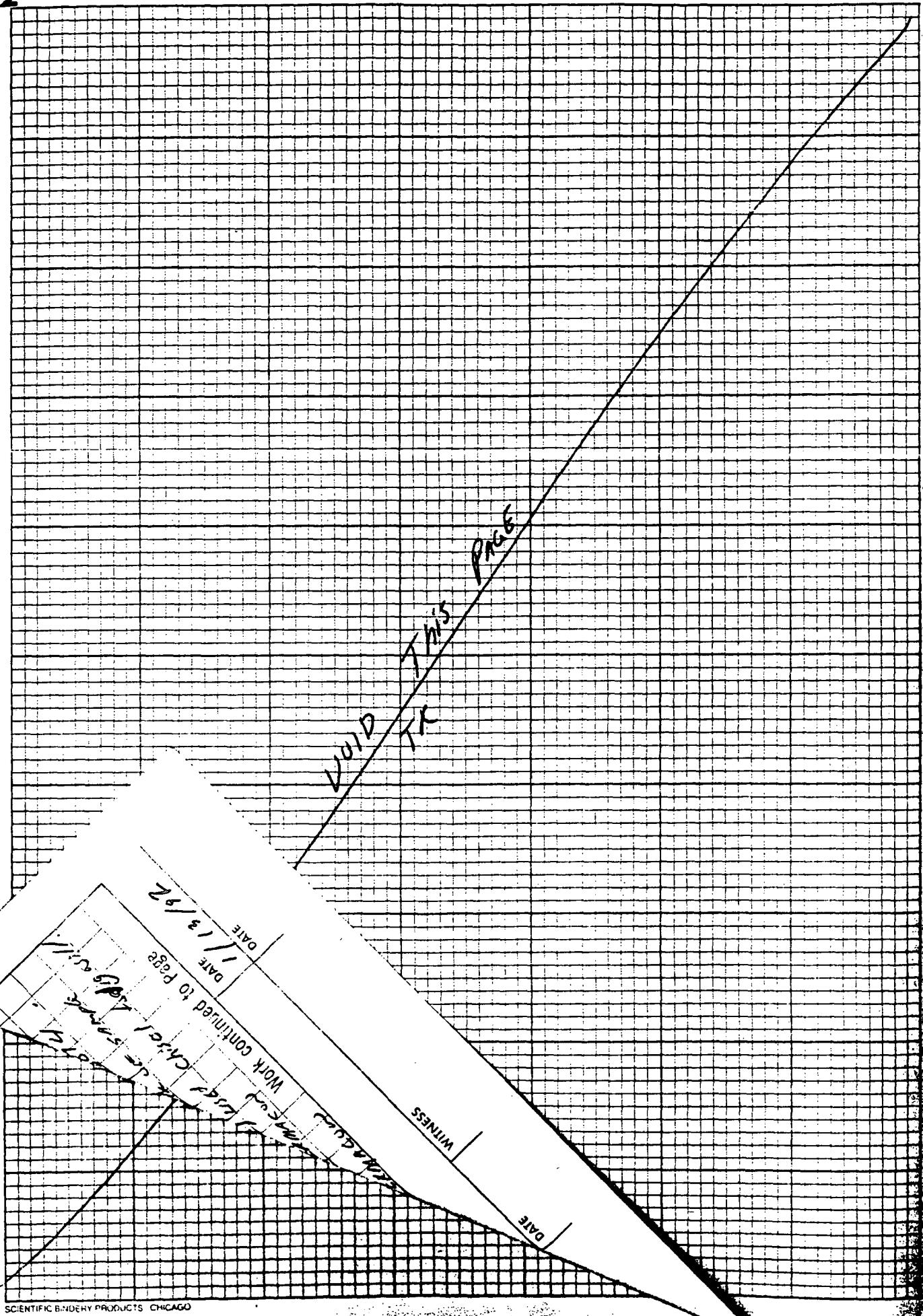
DATE

WITNESS

DATE

1/13/92

DATE



TITLE

PROJECT NO.

123

01-13-92 (cont)

BOOK NO.

Work continued from Page

- 1740 - 1745 - Placed 2 new triwalls into Permacon
- Sample SC-05410-T → 1) Triwall # 3890 PAID # 904 Tent # 10 is stack # F
 Sample SC-06410-T → 2) " # 3956 " # 904 " # 10 " # F (?)
- 1800 - Clearly Greeted all personnel left Tent # 10
- 1950 - Return to Tent # 10 w/ EG&G crew following lunch break.
- 2000 - Enter Permacon
- * 2010 - 2020 - Started collecting SC-05410 - T very hard.
 took (2) shelf tubes call Top A & Bottom B (B most mat.)
 Shelby tube bent, ~2' for undisturbed sample.
 Collect remainder of sample w/ hammer & chisel. Also, used
 drill w/ ~3" bit.
- * 2105 - Started collecting SC-06410 - SC-06410 - T =
 used shovel to obtain Shelby tube sample
 remainder of sample dug out w/ trowel & chisel
- 2130 - Team of samples existed Permacon
- 2213 - ALL EG&G Personnel Exist Tent # 10
- 2230 - LEFT SITE (T. ROVANN)

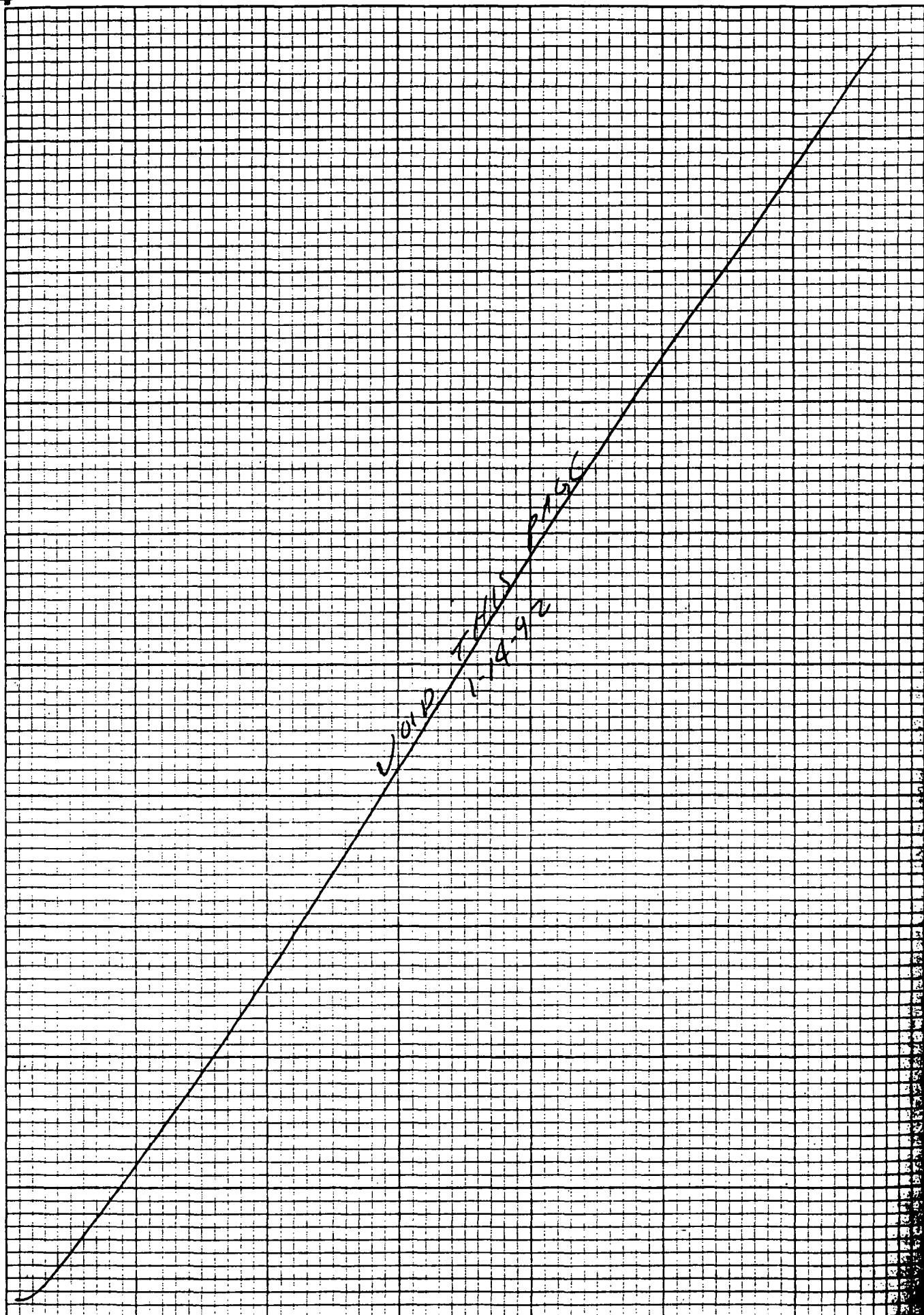
END

SIGNATURE

Tony Roach

DATE

1-13-92



TITLE

PROJECT NO.

125

1-14-92

BOOK NO.

Work continued from Page

0700 Larry Basilio arrives at site. Foremen
Larry Ostdekk gives pre briefing.

0800 Crew seeks spot for Pernacor entry

- Hard Ponderite sample was delivered to Tent 10
last night. Will sample this first by filling
6 x 1/2 gallon paint cans with zip lock liners.

0840 - Crew enters Pernacor

Ponderite triwall 8198 already in Pernacor

0850 Sample PC-hard-T

Note: This sample is not very hard. Cement scooped out
with towels fairly easily. Discuss w/ Paul Frantz
DP will attempt to find another "hard" rockcrete
trivall # PW 12420 at 7 SD pad, bring it to 904 red
and sample it to see if it is "hard". Will store
sample from triwall 8198 until then.

0930 Sample SC-07408-T (04226) Stock F, Red 904
Tent 8

Use chisel hammer to pound in shelly tube sample.
Tire went in about 12-15" back before refusal.

Unsure if this is enough sample. Contact Paul Frantz.

If he has to contact another person and call out here
with answer. Will collect 3 additional samples before
as a back up until answer arrives.

1005 Paul Frantz calls says 12" minimum for
shelly tube sample

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE

Larry Basilio

DATE

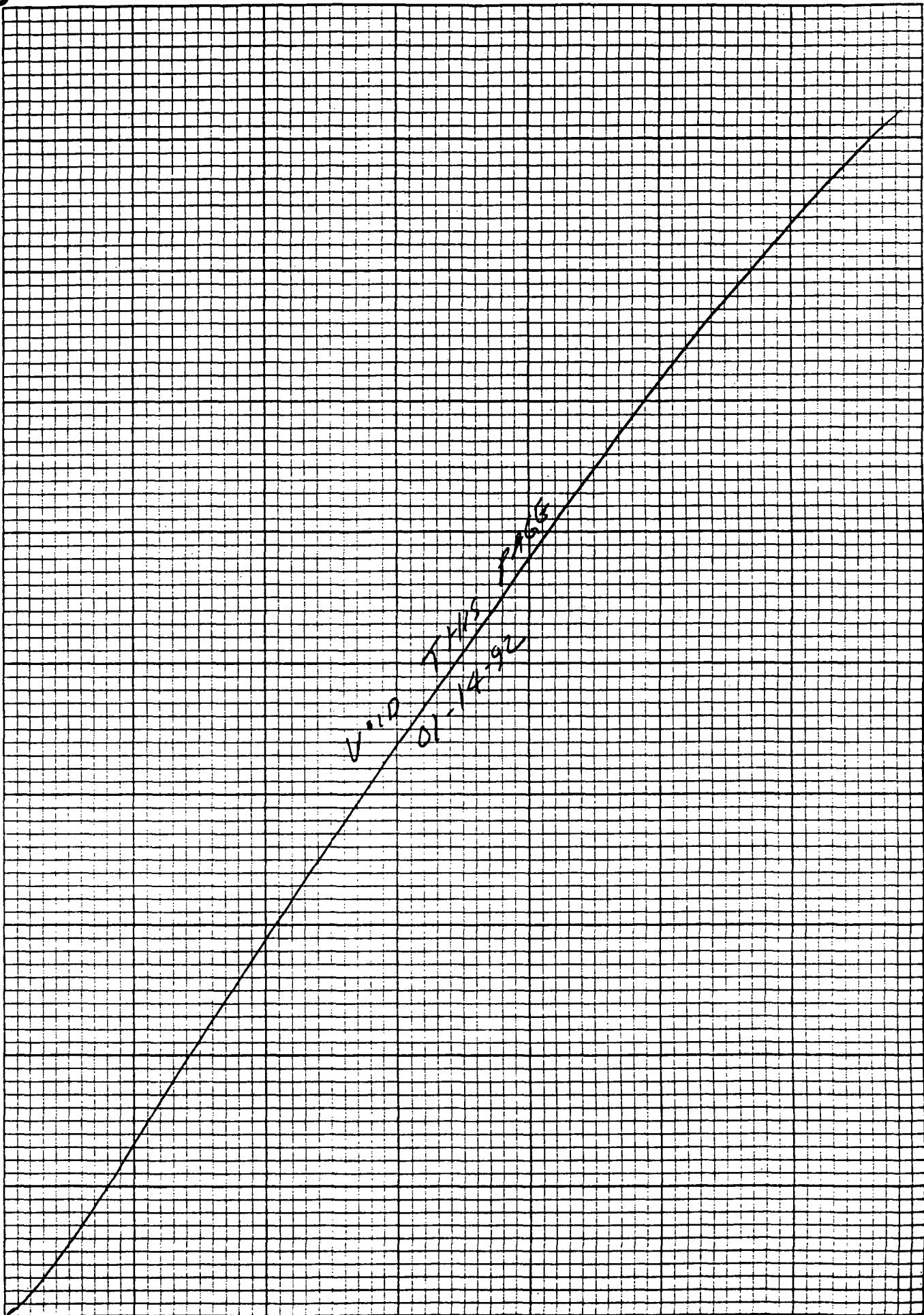
1/14/92

DISCLOSED TO AND UNDERSTOOD BY

DATE

WITNESS

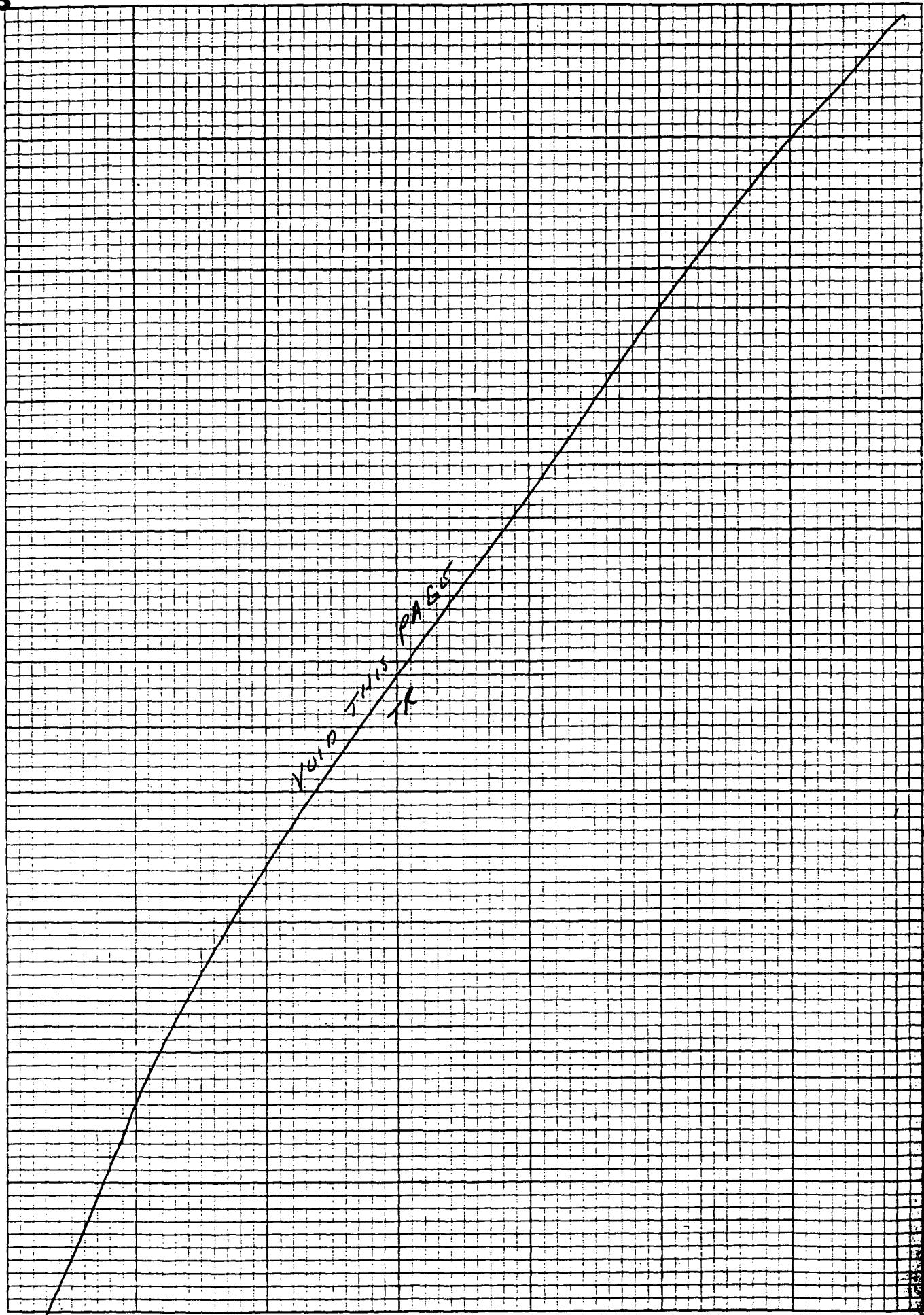
DATE



1-14-92 (cont)

Work continued from Page

- 1030 Sample SC-08408-T (13524) Tent 8
Pad 904
- 1035 From coll to John Schmidt
Because "hard" concrete sample was not hard.
A remixed concrete sample will be substituted. There
are located in Tent 10 and is up to Hwy +
L6+G discretion to choose one
- 1045 Crew extract Permecon for leak break
- 1215 Crew setting up to re-enter Permecon
- 1255 Crew extract Permecon
Will sample as "remixed" Concrete block
- 1300 The "venix" block is not "hard". Able to push
shelby tube 2-3" by hand. Coll Dean Person to
inform him of results.
- Dean Person will confer and get back to us.
In the mean time, will continue Saltcrete sampling
- Decision is to sample a half crate if possible.
Will open and check prior to sampling. Will cut
bands on crate and examine on step off pad
- 1340 Sample SC-09408-T Tent 8
Pad 904
Stake J
- 1400 Sample PC-Hard-H (1103053) Tent 10 Pad 904
very hard concrete, use hammer & chisel to break off blocks



Work continued to Page

۱۱۶۷۳-۲۱

44-4711 11/2 100% A-CW
44-4711 11/2 100% A-CW
TEC-2A11 03837 PAB TSWT SHACK

Table 1: Comparison of the performance of the proposed method with state-of-the-art methods.

1760 - Reindeer 2 m Tarimai # 04059 Fawn fawn

Trunk 111-A 44136 Pad 490d 7-1-# 8

Process 3rd 2nd 5th Triangular 1st 2nd

Reorder and/or sample's could not meet ch. 5c1 to proceed

SHELF LIFE 70S, COLD-REFRIGERATED 51°C. BOTTLED.

Sainte-Catherine 56-11408-T / Télephone = 040-9

Remove 1st two w's & add 3's from previous

SHELDON LANE COLLECTED 3/26/1962

540-10408-7 / TECOM, INC. 04031

~~3~~ " 194 ~~3~~ " 640357 # 11

L " B # " D S G # " 5 5 0 3 5 # " .

WCDM TAUMLW = 04031 PAD = 904 TCM = 8 JACK #

PERFORMANCE

Entra Performance - 5 Elegas en la competencia

All battles had been fought as well as possible.

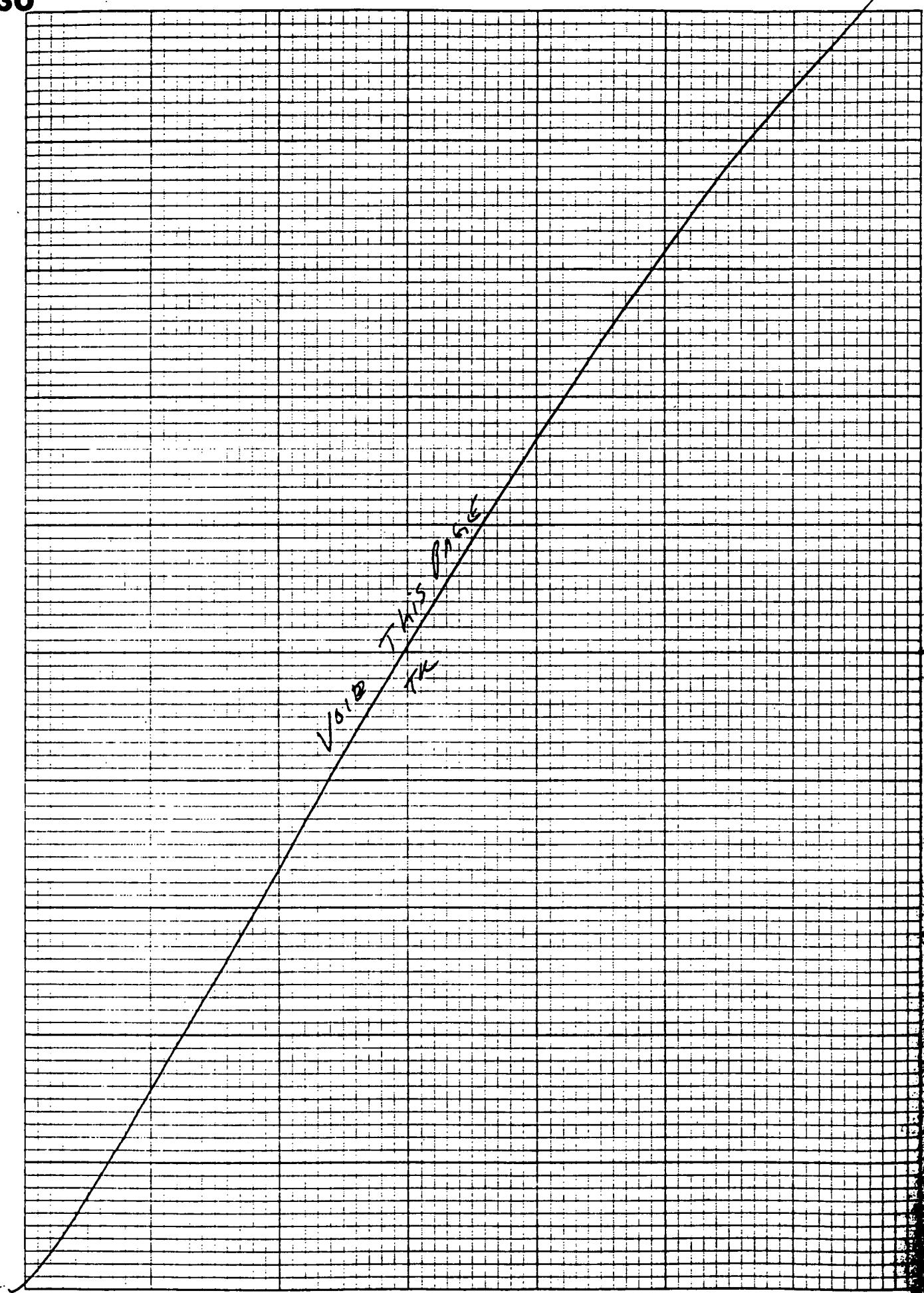
It is recommended that chemists should package all samples.

where I did, that they would bring to dress out in the glaffing hollow.

$\text{Mech} = \frac{1}{2} \mu_1 F_{\text{ext}}^2 \left[\frac{1}{R_1^2} + \frac{1}{R_2^2} - \frac{2}{R_1 R_2} \cos(\theta) \right]$

(Kuwait) Authority Reservation for crew shift change

W.M. not for sale in Canada



TITLE

PROJECT NO.

131

01-14-92 (cont)

BOOK NO.

Work continued from Page

- 1740 hrs - REMOVED 3rd Triwall - 04436 & Placed 2 more
Triwalls in PERMACON
- ~~5 AM~~ 5 AM - TRIWALL # 03937 PAID # 904 TENT # 8 STACK 0
~~4 AM~~ " # 03831 " # 904 " 8 " 0
- ~ 1735 - EG&G out of PERMACON
- 1800 hrs - LUNCH BREAK ALL PERSONNEL LEFT TENT # 10
- 1950 hrs - PERSONNEL RETURN TO TENT # 10
- 2015 hrs - ENTER PERMACON
- * 2025 - Started Collecting SC-13408-T / TRIWALL # 03831
Collected Shelby Tube w/ Sledge Hammer
Collected REMAINDER w/ sample w/ chisel & Towel
- * 2045 - Started Collecting SC-13408-T / TRIWALL # 03937
Collected Shelby Tube w/ Sledge Hammer
Collected Remaining sample w/ mallet, chisel & Towel
- 2050 - Removed TRIWALL # 03831 From PERMACON
- 2105 - Removed last TRIWALL # 03937 From PERMACON
- 2120 - ALL PERSONNEL OUT OF PERMACON
- 2200 - ALL PERSONNEL OUT OF TENT # 10
- 2210 - T. ROJAHAN LEFT SITE

END

SIGNATURE

DISCLOSED TO AND UNDERSTOOD BY

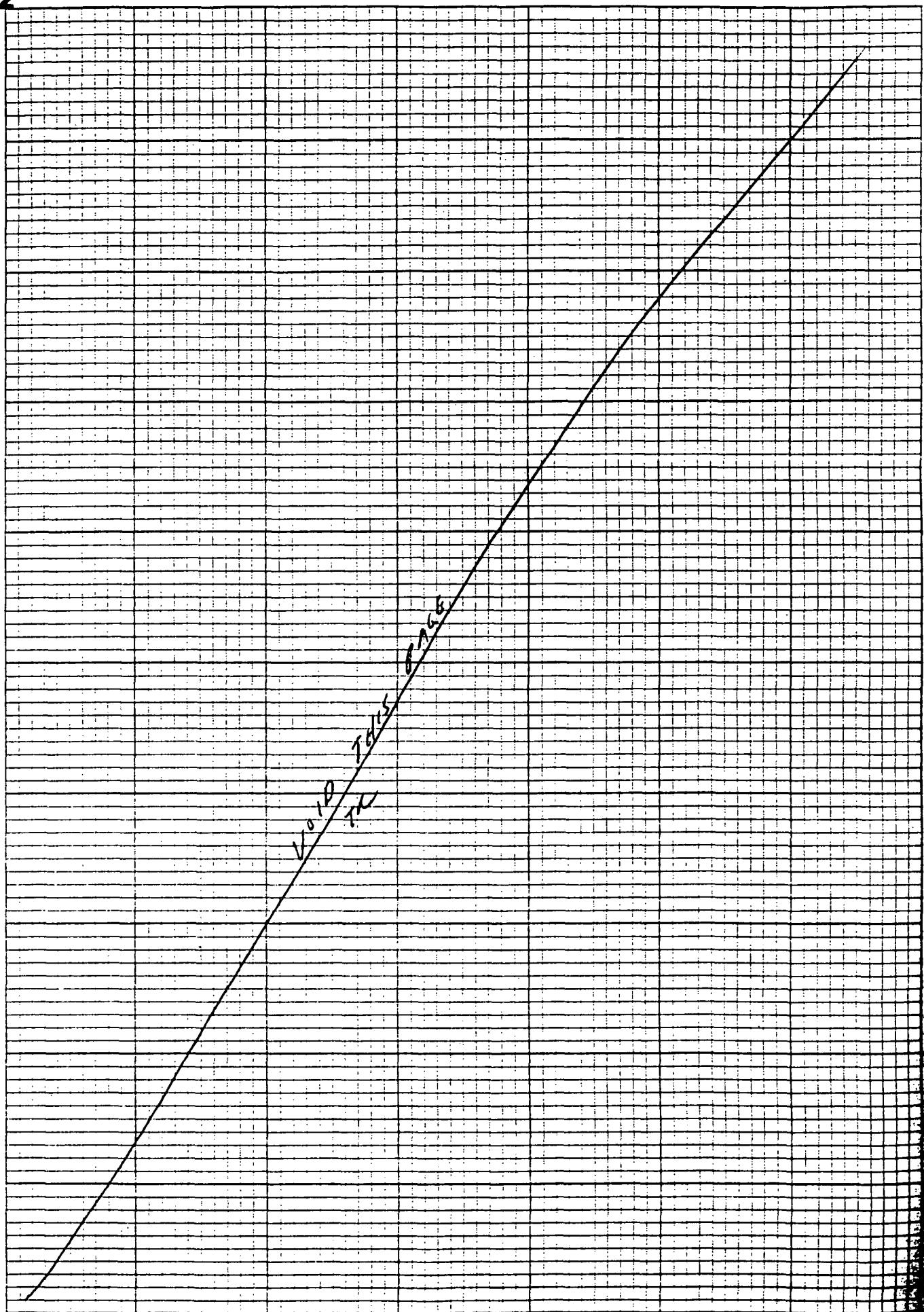
DATE

01-14-92

DATE

WITNESS

DATE



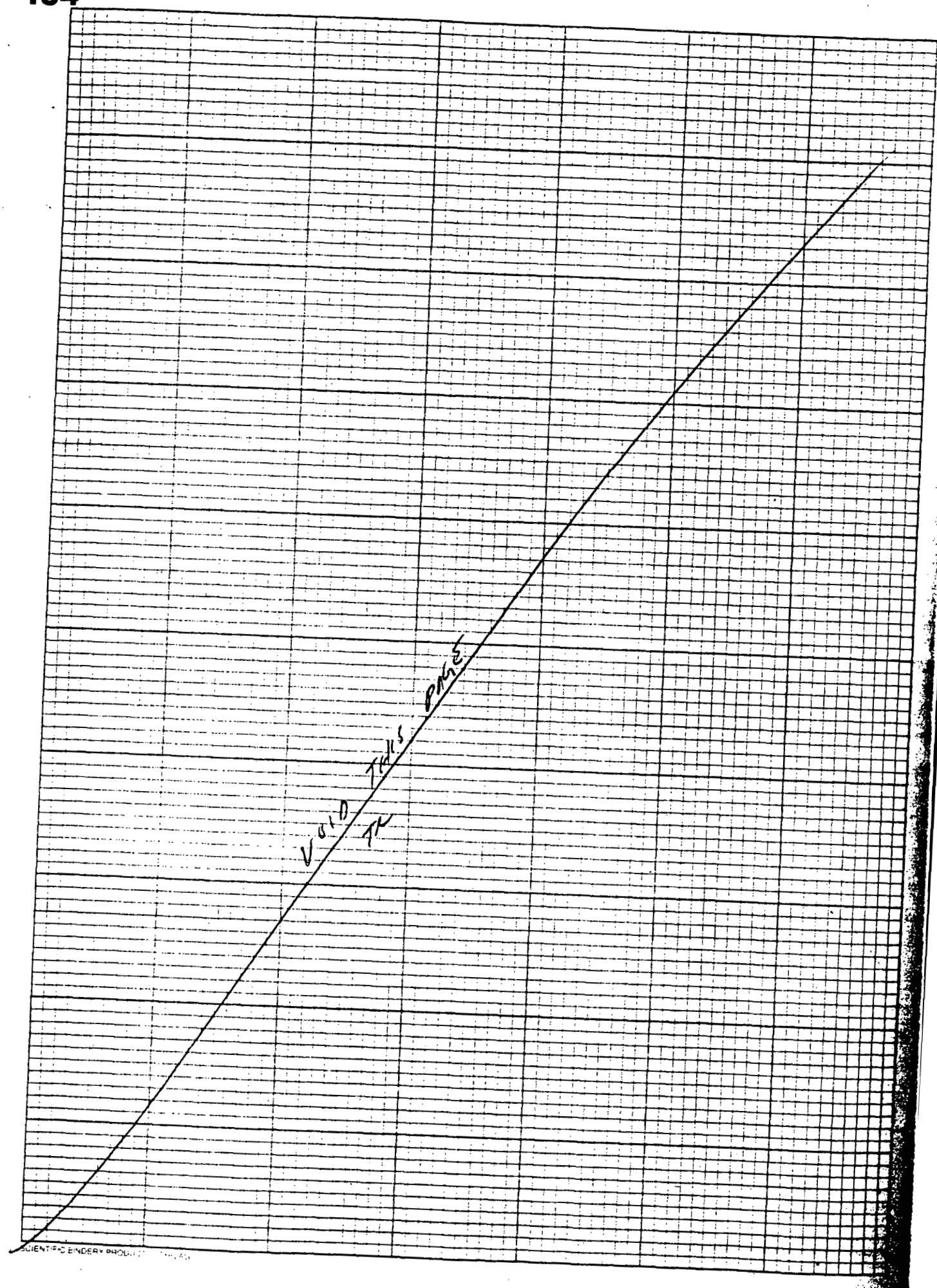
WORK CONTINUED FROM PAGE		WITNESS		DATE		DATE		CLOSED TO AND UNDERSTOOD BY	
								HONORABLE	
								KODAKIC BINDER PRODUCTIONS CHICAGO 6905	
								WORK CONTINUED TO PAGE	
								1/15/92	
								L 605/10 5023 to HHS Office	
								1017 Samples packed. Quality controls to be used always	
								5 columns were placed in box D-78379	
								5 columns are plastic and unbreakable. The 2 x 5 x 11/2	
								columns will be shipped	
								Additional 5 columns of wood 1/4" foam C size	
								D - 78382	
								D - 78375	
								D - 78381	
								D - 78367	
								D - 79379	
								D - 78370	
								D - 78364	
								Samples shipped in 2 x 5 x 11/2	
								Q90 (Line of least four placed in box D-78370)	
								Because it has unbreakable	
								Q830 Melted 1 sample/box on box 2674 during	
								Later melt is for packaging of samples	
								Q800 Later melt	
								Quality of 5+digit numbers during labeling	
								Q745 It has been records L 605/10 to following changes	
								there to change into DCE supplied class	
								Q700 L 605/10 analysis at Site	

۱۳۳

BOOK NO.
PROJECT NO.

1-13-92

TITLE



01-15-92 (cont)

Work continued from Page

Discussion with John Schmidt

- sample wednesday PM and Thursday. Ship Friday.
- no limit to Saltcrete samples this week. Next week a maximum of 20 samples only
- Lab sending coolers to office. Unsure of amount.

1215 L Basilio onsite. Signs shipping paperwork
Terry Wozahn drops off sample coolers.

1400 L Basilio escorts drums to Bldg 130 (shipping)

1445 Drums loaded onto trailer. Driver briefed on procedures.

1600 Hrs - 2nd SHIFT ENTER TENT # 10

PREP. TO SAMPLE SALTCRETE

1600 - Prepared Trip Blank For Water samples (SC-14408-T-T-W)

1620 Hrs - EG&G Personnel Start Permacon Entry

1625 - COLLECTED FIELD BLANK SC-14408-T-F Both collected by C.Gaete

1630 - 11 RINATE II SC-14408-T-B RINATE W/SS Bucket

1650 - PUT (2) TRIWALLS into Permacon

TRIWALL A 04174 PAD # 904 TENT # 8 STACK B

" " 04162 PAD # 904 TENT # 8 STACK B

1655 - Prepared Trip Blank SC-15408-T-T For SOLVO samples

1700 - Started Collecting SC-15408-T From Triwall 04174

SHELBY TUBS COLLECTED w/ SLEDGE HAMMER

Remainder of Sample Collected w/ Chisel & trowel

1730 - Start collecting SC-16408-T From Triwall 04162

SHELBY TUBS COLLECTED w/ SLEDGE HAMMER

Remainder of Sample Collected w/ Mallet Chisel & trowel

1745 ~~SHEDDY PRODUCTIONS~~ place 3rd triwall (0828) in Permacon Work ~~Reparted to 04174~~

SIGNATURE

DATE

Terry Wozahn

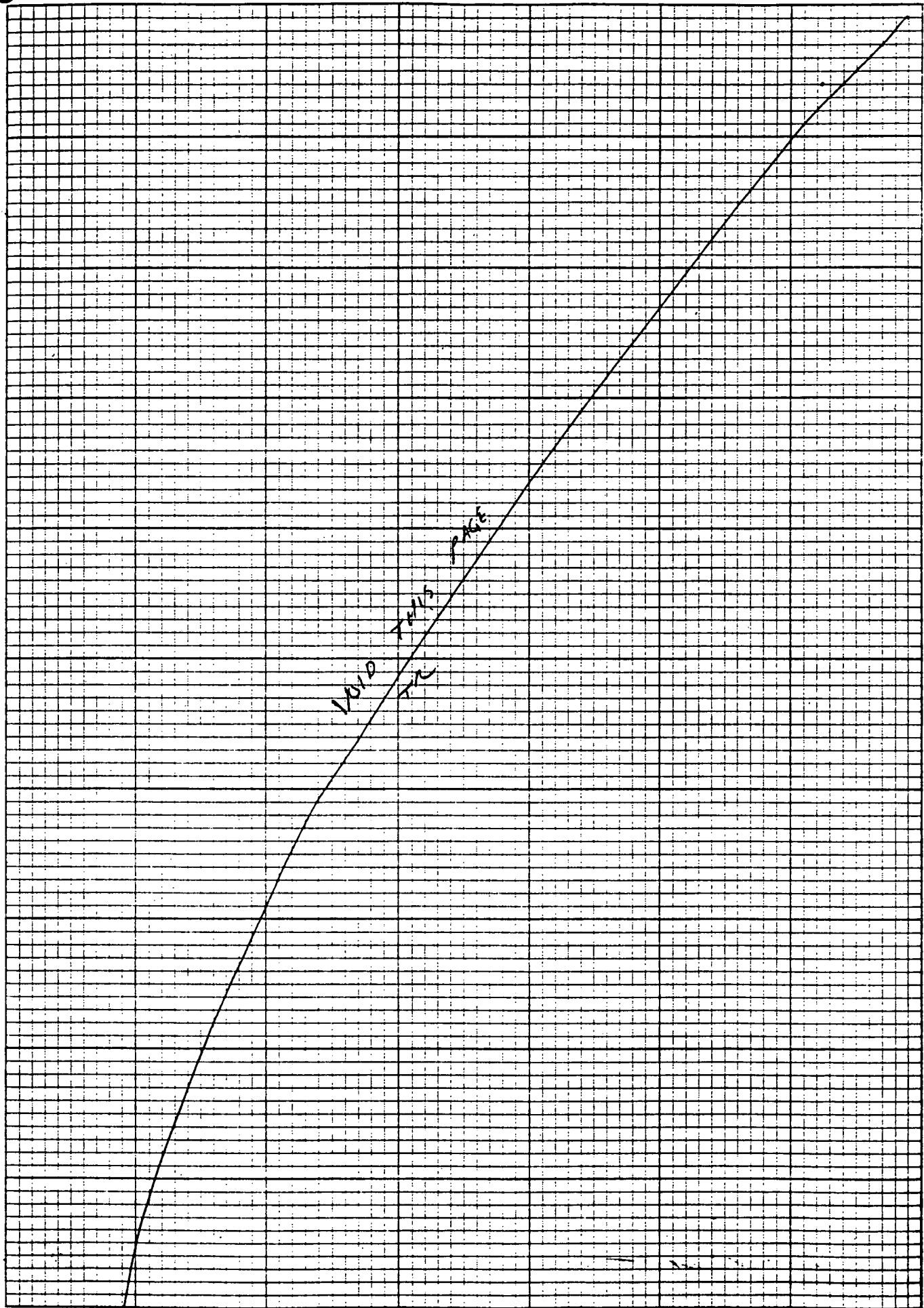
1-15-92

DISCLOSED TO AND UNDERSTOOD BY

DATE

WITNESS

DATE



TITLE

PROJECT NO.

137

BOOK NO.

01-15-92

Work continued from Page

- 3rd Triwall # 02828 PAD # 904 TENT 8 STACK O
- * 1800 Hrs - Start Sampling SC-17408 - T TRIWALL # 02828
SHELBY TUBE collected w/ Sledge Hammer (MAT. Softer than
first 2 Triwalls).
Remained of sample collected w/ chisel & trowel
- 1803 - Removed 2nd Triwall from Permacon Triwall # 04162
& placed the 4th Triwall into Permacon to do
After Lunch Break
- 1815 -
- 1825 Hrs - EG&G Exist PERMACON
- 1900 Hrs - T. Rosign & L. Basilio left ~~PERMACON~~^{TENT #10} NO EG&G personnel remain
- 2000 Hrs - Staff Returns to TENT #10
- 2010 Hrs - ENTER PERMACON
- 4th Triwall # 02225 PAD # 750 TENT # NUNE STACK NUNE
5th " # 03011 PAD # 750 TENT # NUNE STACK NUNE
- * 2020 - Start collecting SC-185XX-T TRIWALL # 02225
Shelby tube collected w/ sledge hammer
Remainder of sample collected w/ chisel & trowel
- 2023 - Removed triwall #3 and placed the 5th triwall
IN Permacon
- * 2035 - Start collecting SC-195XX-T From Triwall # 03011
Shelby tube obtained w/ sledge hammer
Remainder of sample obtained w/ Chisel & Trowel
- 2040 - Removed 4th triwall from Permacon
- 2050 - " " 5th " " " "
- 2100 - EG&G personnel Exist Permacon
- 2140 - T. Rosign LEFT TENT #10 (9) RATS remain.
- 2150 - Check out C trailer
- END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

DATE



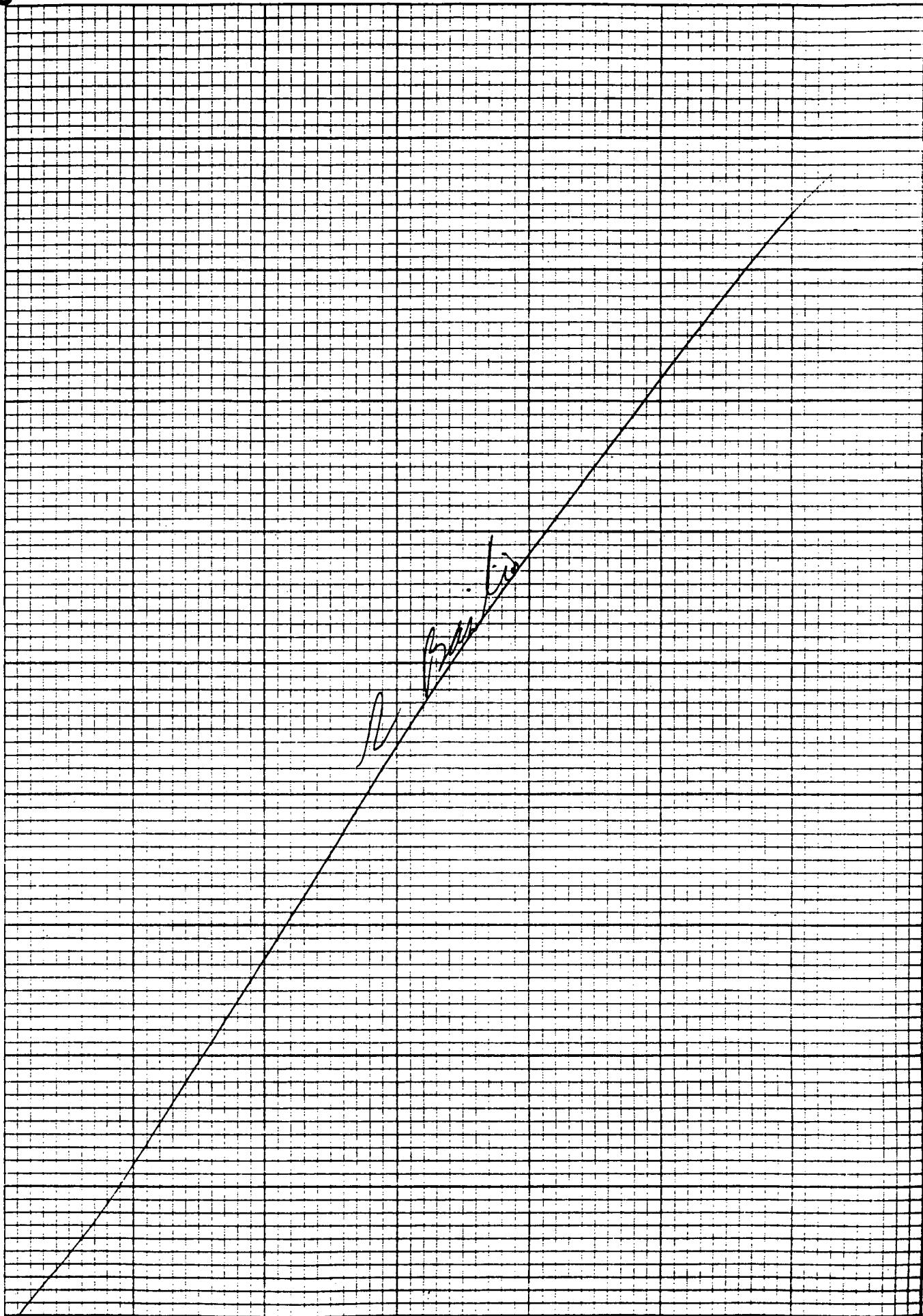
1-15-92

DISCLOSED TO AND UNDERSTOOD BY

DATE

WITNESS

DATE



TITLE

PROJECT NO.

139

1-16-92

BOOK NO.

Work continued from Page

0700 L Basilio arrives and changes out at
change trailer in DDC clothing

0800 Crew ready up to enter Prison after
morning briefies

0840 Crew enters Prison. 2 triwells in already
Triwell 02585 Pad
Text
Stack

Push shelby tube in with Rush lift fairly easily

0900 Sample SC-205XX-T (02585)

Use spoon, hammer + chisel to obtain sample

2nd Triwell 02237 Pad
Text 750
Stack

925 Use Rush lift to push shelby tube into Saltcote

Crew smells strong ammonia odor when triwells
are opened.

930 Sample SC-215XX-T (02237)

955 Sample SC-225XX-T (03137)

Push shelby tube w/ Rush lift. Use funnel to sample

SCHNEIDER BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

Larry Basile

DATE

1/16/92

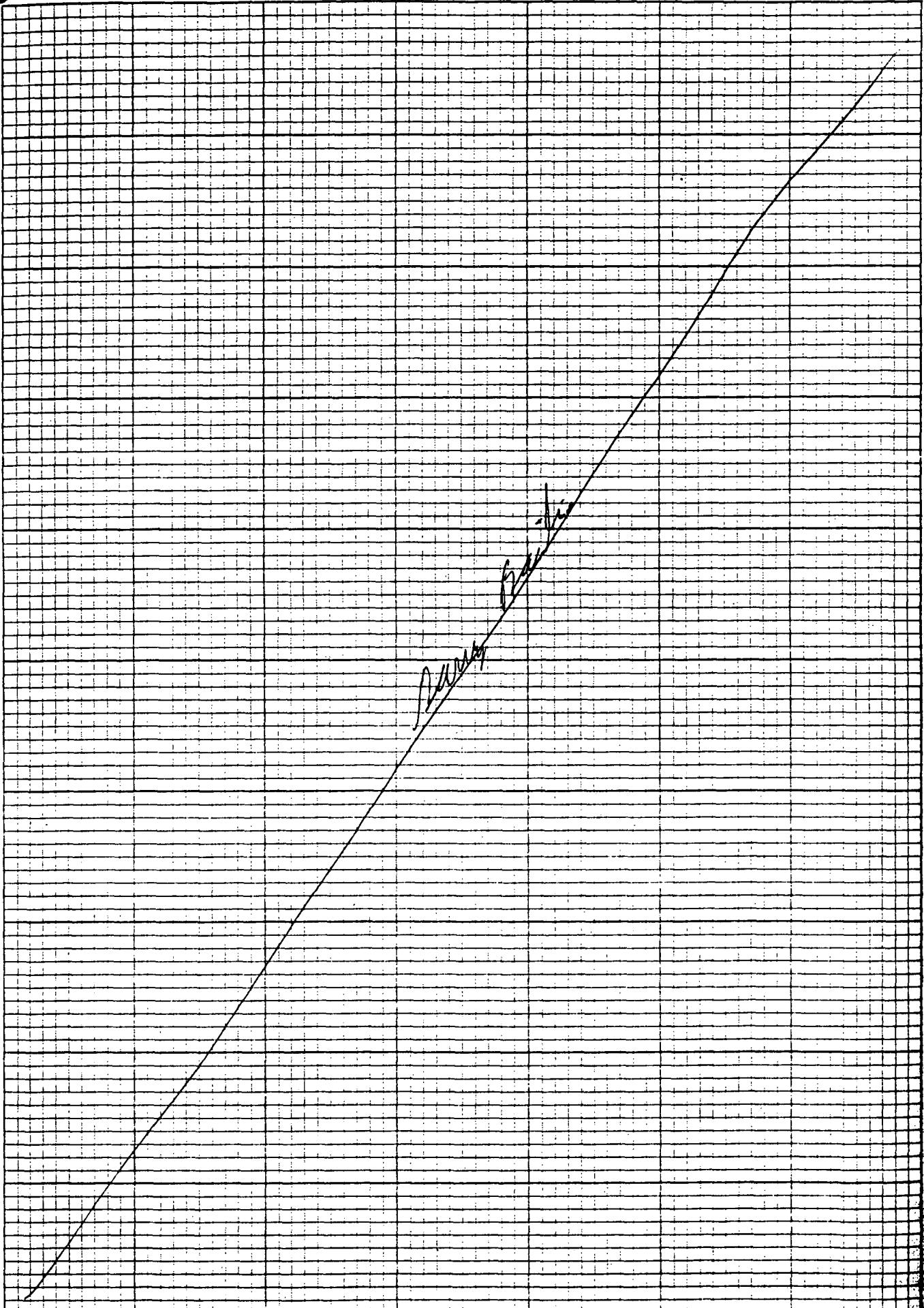
DISCLOSED TO AND UNDERSTOOD BY

DATE

WITNESS

DATE

140



TITLE

PROJECT NO.

141

BOOK NO.

Work continued from Page

01-16-92 (cont)

Trivwell 03137

Tent

Pad

750

Stack

1010 Crew exiting Rennacou for break

1215 Crew starting up to enter

1245 Crew enter Rennacou. 2 trivwells placed inside

Trivwell 03456

Tent 8

Pad 904

Stack C

Used sledge hammer to pound shelly tube into Seltzsch

1300 Sample SC - 23408-T (03456)

begin Trivwell 04084

Tent

Pad

Stack

Unable to push shell by tube into trivwell 04084

Used drill and hammer and chisel to obtain sample

Sample is very hard

1320 Sample SC - 24408-T (04084)

Fill an addition 3 jars because a shelly tube sample could not be taken

1345 Crew depositing Rennacou for shaft break
process samples.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

Larry Basile

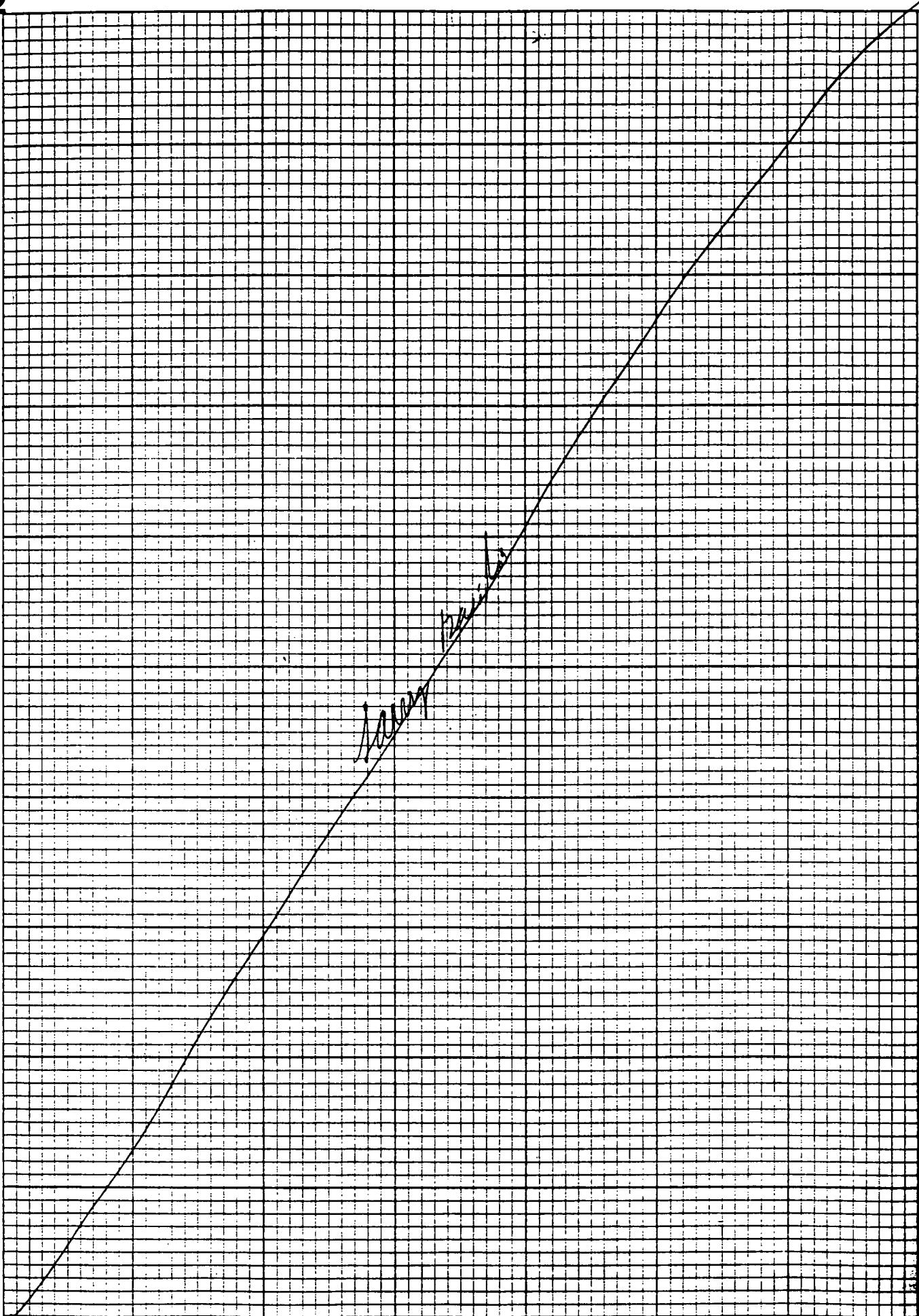
DATE
1/14/92

DISCLOSED TO AND UNDERSTOOD BY

DATE

WITNESS

DATE



TLE

PROJECT NO.

143

01-16-92 (cont)

BOOK NO.

Work continued from Page

- 1440 L Basilio requested to contact Leon Collins
446-8980 to discuss sampling procedures of saltcrete. L Basilio informs L Collins of sampling process.
- 1545 - 2nd SHIFT Enter TENT #10
- 1600 - EGEG Personnel Enter Permanent
- { 1st Triwall # 02549 RAD # 904 TENT # 8 STACK C
2nd Triwall # 03653 RAD # 904 TENT # 8 STACK -
- 1605 - STARTED COLLECTING SC-25408-T Triwall # 02549
SHELBY TUBE COLLECTED w/ SLEDGE HAMMER
Remainder collected w/ mallet, chisel & trowel
- 1625 - STARTED COLLECTING SC-26408 -T Triwall # 03653
SHELBY TUBE COLLECTED w/ SLEDGE HAMMER
Remainder of sample collected w/ mallet, chisel & trowel/
removed 1st triwall @ ~1625
- 3rd Triwall # 03125 (PLACED inside ~1625) RAD # 750 TENT # - STACK -
4th Triwall # N/A (" " ~1640) RAD # - TENT # - STACK -
Removed 2nd triwall @ 1644 hrs. ^{foraminifera}
^{think 750}
- 1645 - STARTED COLLECTING SC-275XX -T / Triwall # 03125
Collected Shelby Tube w/ Sledge Hammer (Mat looks powdery)
11 Remaining w/ ^{CIGARS} clean gloves
- 1700 - took out triwall 3 AND put in 5th triwall
- 5th Triwall # 04160 RAD # 904 TENT # 8 STACK B
- 1705 - started collecting SC-285XX -T / Triwall # UNKNOWN DATE = 6-25-89
Collected Shelby Tube by pushing it with hand
Remainder of sample collected w/ clean gloves

THE ENDY PRODUCTIONS CHICAGO 60605

Work continued to Page

ATURE

DATE

Tony Royal

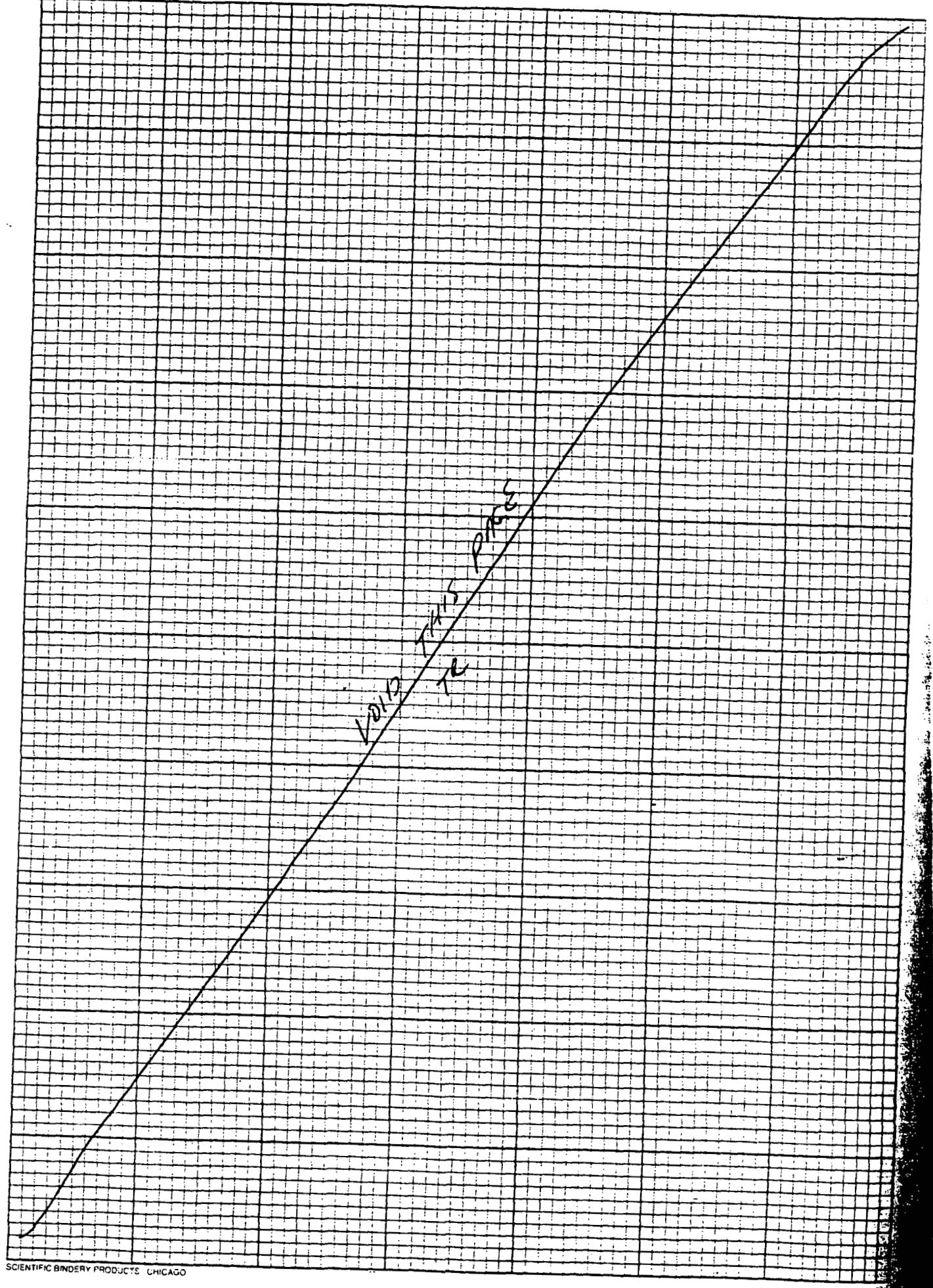
1

OSED TO AND UNDERSTOOD BY

DATE

WITNESS

DATE



01-16-92 (Cont.)

BOOK NO.

Continued from Page

135 - Start Collecting SC-294 08-T / Triwall #04160

Collected Shelby Tube via Sledge hammer

Remainder of sample w/ mallet, chisel & spoon

135 - Removed 4th Triwall ~~(#)~~ and placed 6th Triwall into permanent.

Triwall #2793 PAD # 904 Tent # 8 STACK -

1300 - Started ~~SC~~ (R) SC-30408-T / Triwall #2793 ^{very hard soil}

- Shelby tube collected w/ sledge hammer
- two tubes collected (A (Top 8") &

SHELBY TUBE COLAPSED \rightarrow B \rightarrow Lost sample \rightarrow going w/ 3202 Jars

Both times \rightarrow FOR UNDISTURBED parameters

- Remainer of sample collected w/ mallet, chisel & trowel

- ECG & G Personnel Exist Permanent

- 5th & 6th Triwall Removed From Permanent

END OF Sampling FOR THIS DATE

WILL ^{CONTINUE} package samples AFTER LUNCH BREAK.

- L. Basile & T. Johnson last out of Tent #10

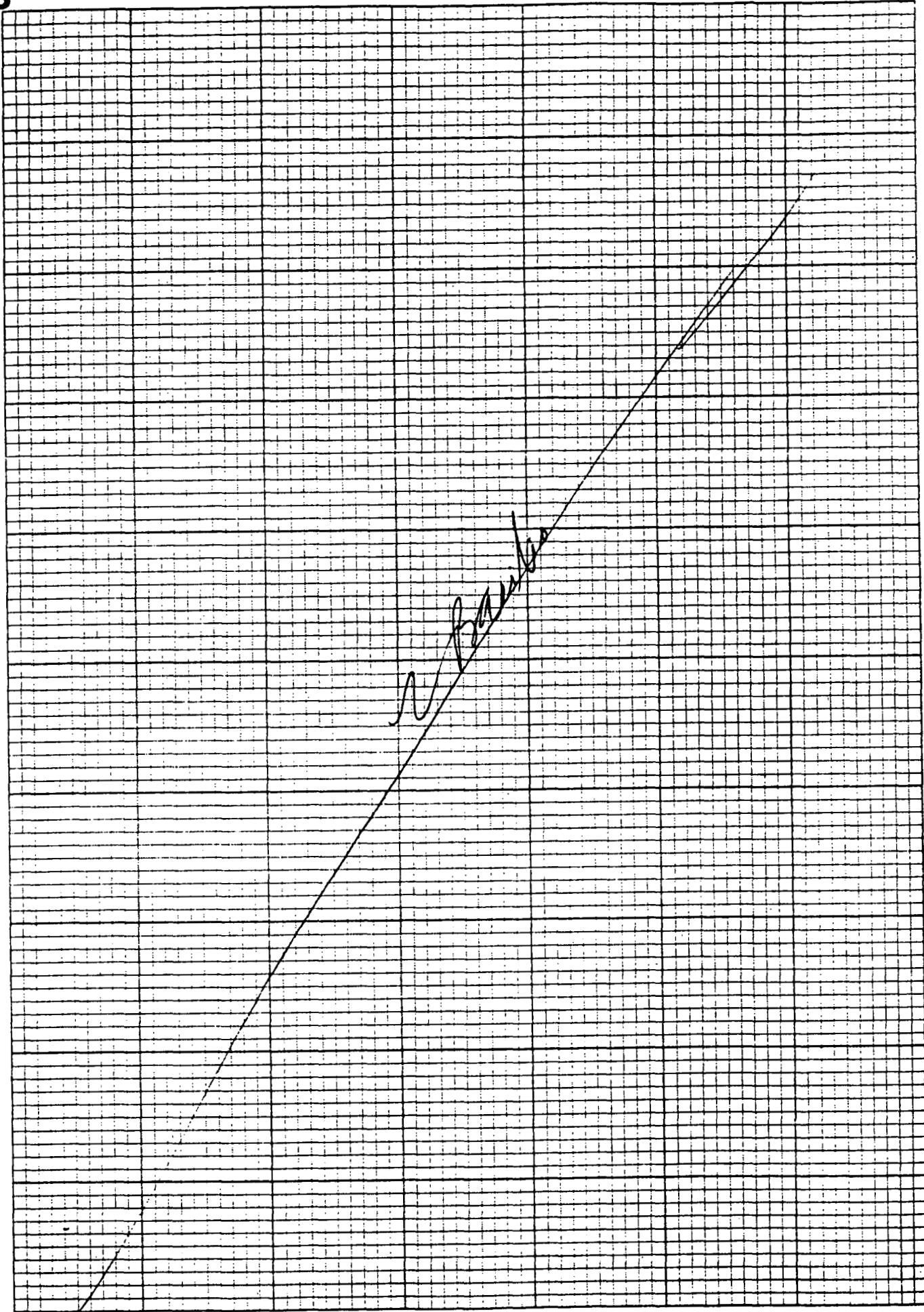
FOR LUNCH BREAK

130 - Returned to Tent #10 to package samples

130 - Finished packaging samples that don't require cooling

135 - LEFT 904 Tentice

END



TITLE

1-17-92

PROJECT NO.

BOOK NO.

147

Work continued from Page

0700 Larry Basilio arrives at site
Change into DOC clothes

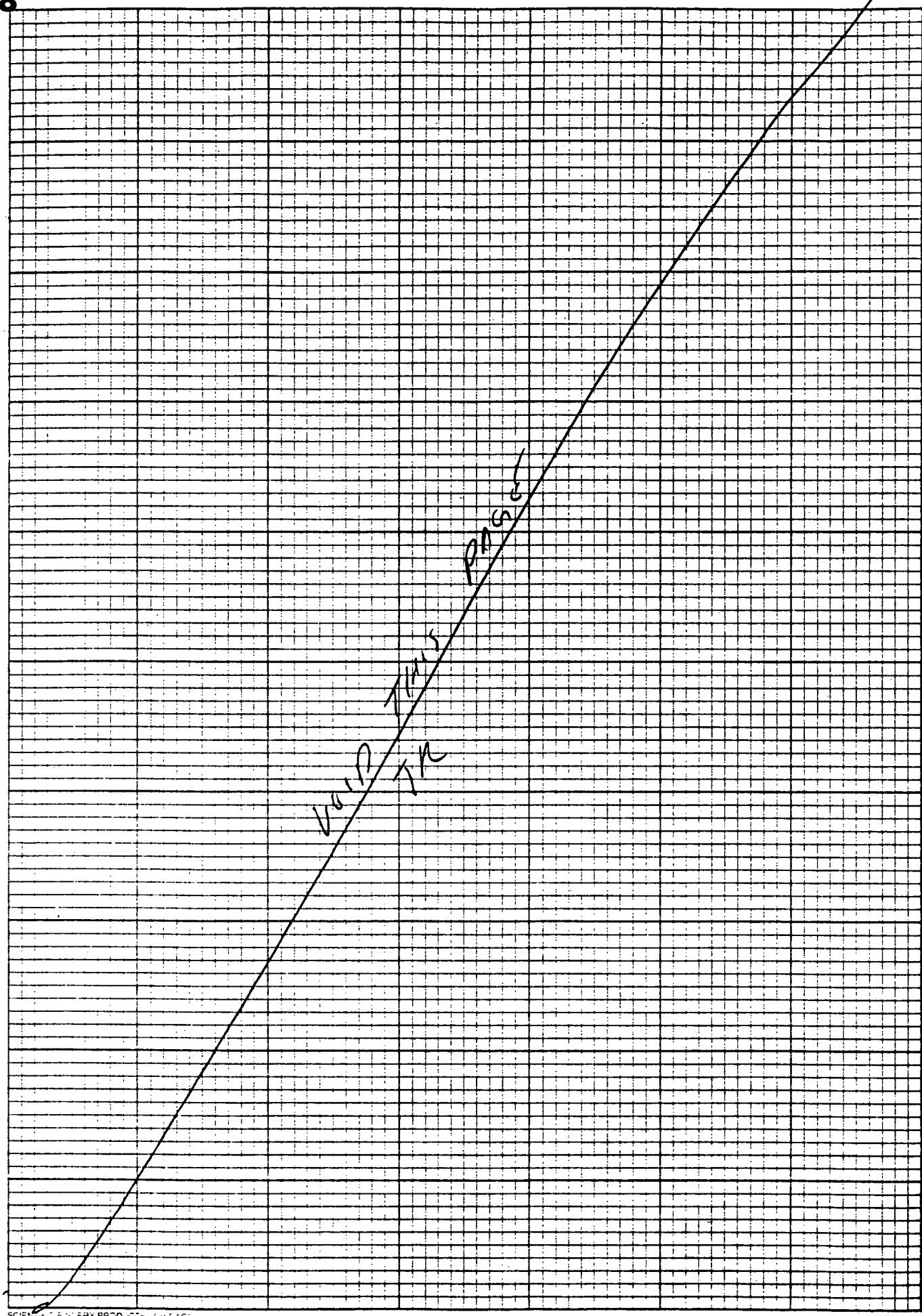
0745 Begin packaging samples

0740 Finish packing samples. T Mojaha to UNIS office
to pick up extra large coolers for shelby tubes
LGG + G crew on break

1020 Package shelby tubes in 2 x 100 quart coolers

Wash + stick coolers on pallets. Carpenter
load pallets. Send paperwork to shipping for proper
clearances

1300 L Basilio signs shipping memo. Leave site



TLE

PROJECT NO.

149

1-20-92

BOOK NO.

Work continued from Page

0702 Lavit Basilio arrives site. Dresses out into DOE clothes

0800 LG+G Crew setting up to enter Revmecon

0835 Crew enters Revmecon. Two triwalls already
inside.

1st Triwall 03440

Pad

Tent

Stack

Use sledgehammer to pound in shelby tube

900 Sample SC-31XXX-T (03440)

Use hammer, chisel and trowel to sample.

2nd Triwall 02410

Pad 750

Tent

Stack

Push shelby tube halfway with Rivet. Hammer with sledgehammer.

915 Sample SC-325XX-T

use hammer, chisel, trowel to sample

925 Remove Triwalls 1 + 2 insert next two triwalls

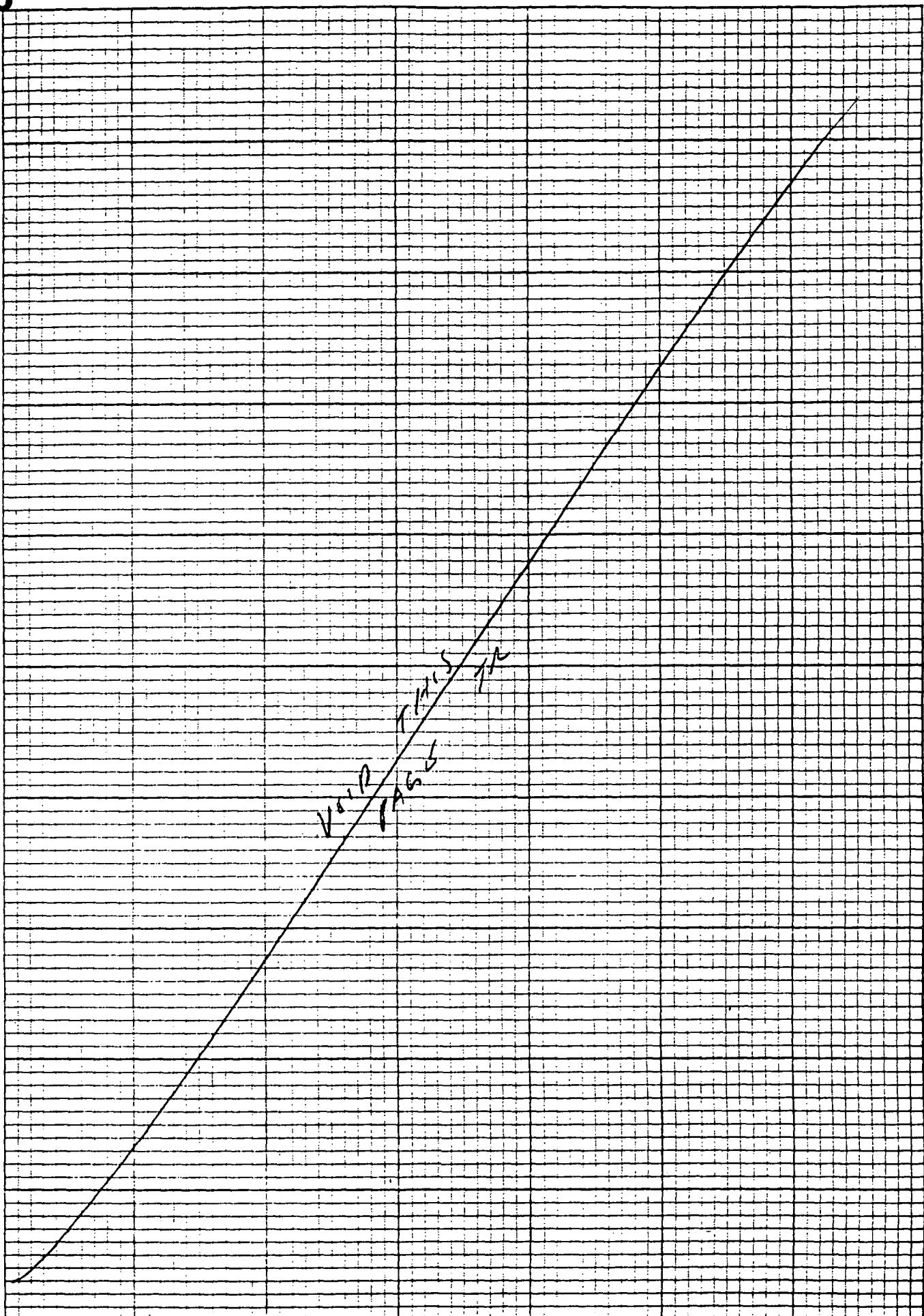
3rd Triwall 03018

Pad 750

Tent

Stack

150



1-20-92 (cont)

Work continued from Page

Use forklift to push tube halfway, then slide hammer the rest of the way.

940 Sample SC-33XX-T (03018)

Use hammer + chisel to sample

950 Crew clearing top and leaving Permacon

1200 Crew returns to dress out top Permacon

1220 Crew enters Permacon

4th Trivall 02539

Ped 904

Tens 8

Studs

Push Shelby tube easily with forklift

1225 Sample SC-34XX-T (02539)

Use chisel + trowel to sample

5th Trivall 03037

Tens

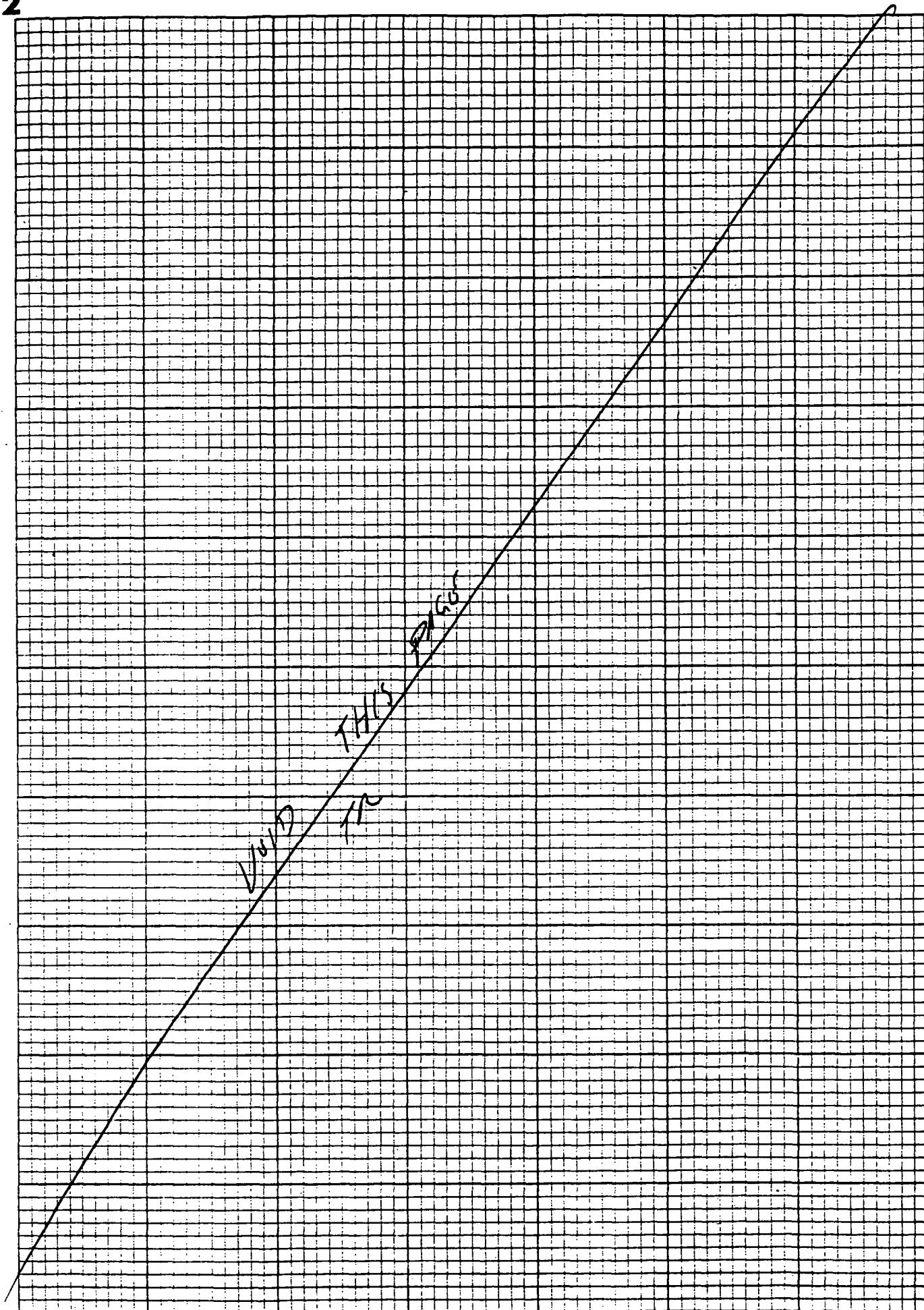
Ped 750

Studs

Push Shelby tube fairly easily with forklift

1250 Sample SC-355XX-T (03037)

Use chisel and trowel to collect sample



01-20-92 (cont)

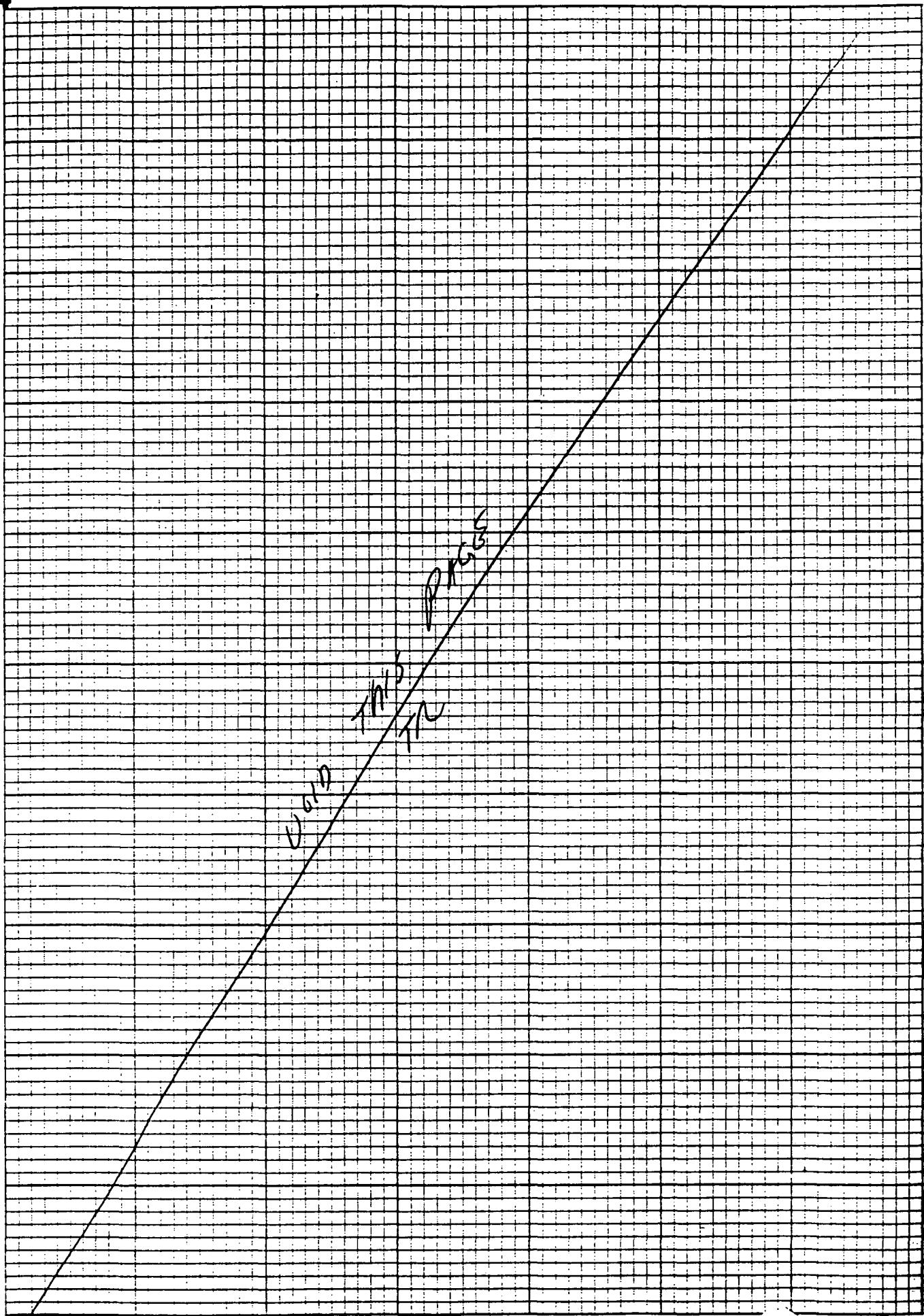
Work continued from Page

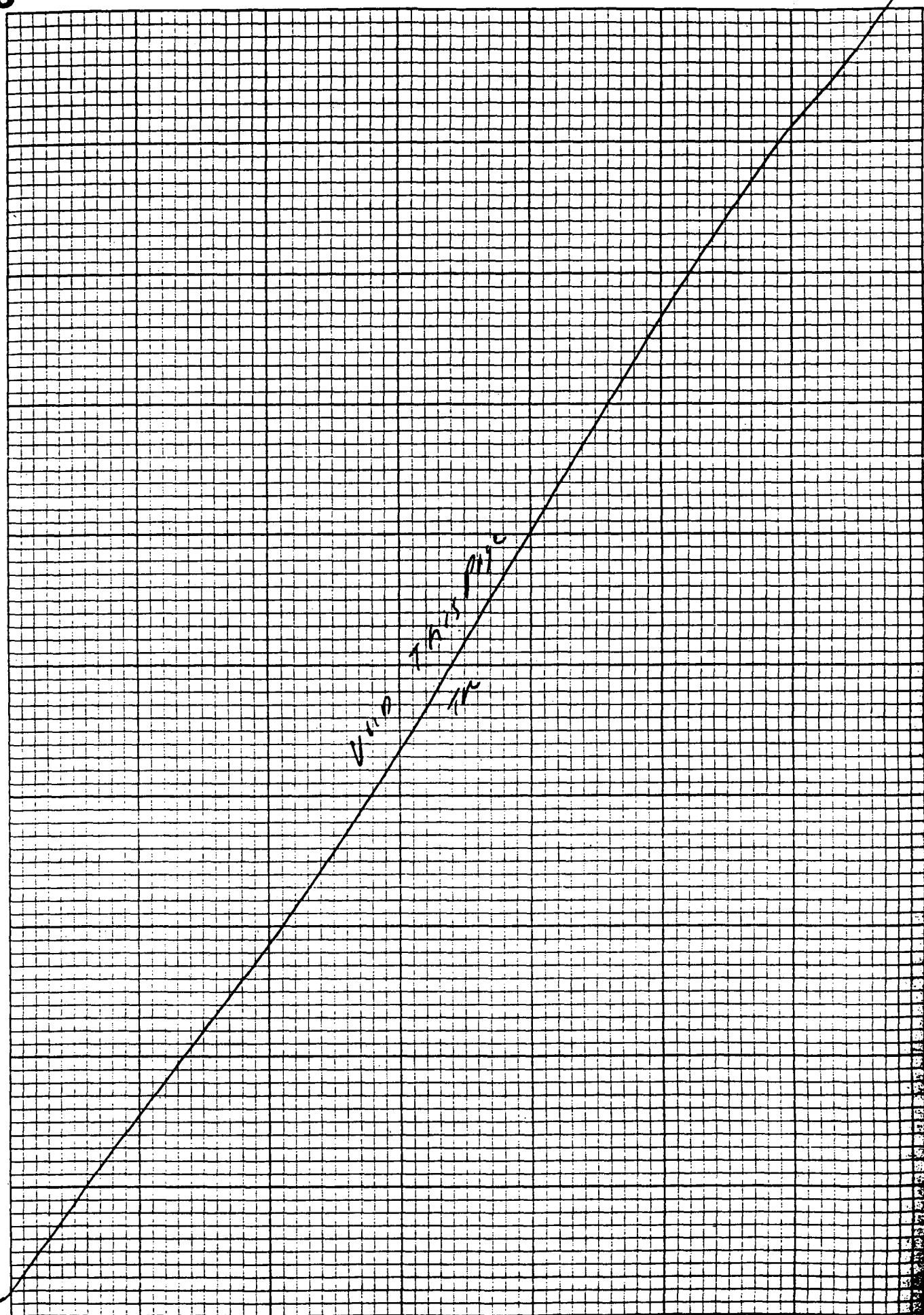
- 1305 Crew exiting Permacon. No more sampling because some of the crew must leave to attend previously scheduled functions
- 1345 L Basilio dresses out and heads to HNRUS office to pick up supplies
- 1445 Larry Basilio and Tony Rojana arrive and dress out
- 1520 - L Basilio & T Rojana enter Tent #10
Prep bottles for samples & blanks
- 1545 - PREP. WATER TRIP BLANK SC-355XX-T-T-W
- 1550 - 2nd SHIFT ARRIVE IN TENT #10
SUIT UP FOR PERMACON
- 1600 - 2 TRIWALL ALREADY INSIDE PERMACON w/ EEG Personnel
- 1605 - SC-355XX-T-F @ 1610 SC-355XX-T-B Collected
BY C.Godz
- 1610 - SC-36408-T
TRIWALL #04634 PAD # 904 TENT # 8 STACK A
SHELBY TUBE COLLECTED w/ Sledge Hammer
Remainder of sample collected w/ Chisel & Trowel
- 1635 - START SC-37408-T & SC-37408-T-D
TRIWALL # 03817 PAD # 904 TENT # 8 STACK -
SHELBY TUBE COLLECTED w/ Sledge Hammer
Remainder of sample collected w/ Chisel & Trowel & Spade
Grey Powder
- 1640 - Removed 1st triwall Replace w/ 3rd triwall
- 1700 - Collected SC-38408-T
TRIWALL # 03886 PAD # 904 TENT # 8 STACK -
SHELBY TUBE COLLECTED w/ Sledge Hammer
Remainder of sample collected w/ mallet, chisel & trowel

GNATURE

DATE

1/20/92





1-21-92

Work continued from Page

0700 Larry Basilio arrives at site and dresses out

0800 Crew starts up to sample in Permecon

Will sample Metal Saltcone tunnel

(Container M 00818)

pgd 904

Trut 8

Stack Q

Tunnel 04099X¹⁰

-04041 04/01 28

914 Crew enters Permecon

925 Container enters Permecon

Push Shelly tube part way into Tunnel 4099
use sledgehammer to pound it in.945 Sample SC-4(408-M) and SC-41408-M-D
(Tunnel 4099)

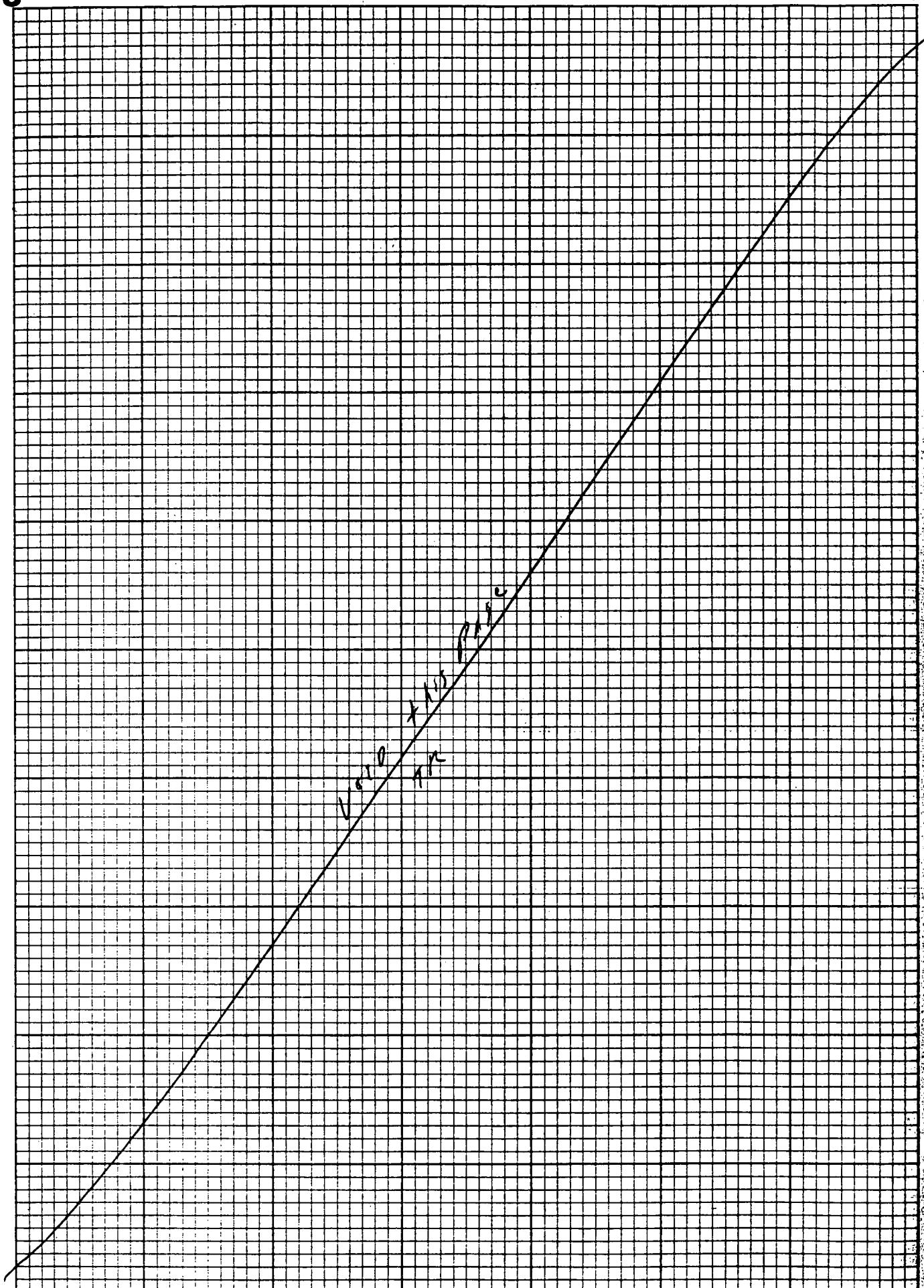
Use hammer, chisel, shovel to collect samples

1000 Collect Field blank SC-41408-M-F

1015 Basilio collecting 11 gallon composite from tunnel 4101
(previously sampled tunnel 4101 on 1-7-92 for
environmental parameters). Not enough sample liquid been
collected previously

1020 Collect Vugsate blank SC-41408-M-B

1035 Crew exiting Permecon for lunch break



01-20-92 (cont)

Work continued from Page

- 1700 - removed 2nd triwall and replaced w/ 4th triwall
- 1735 - EGEG Personnel Exist Permanon
Removed 3rd Triwall and Replace w/ 5th Triwall
- 1752 - EGEG Personnel LEFT Tent #10 for lunch break
- 1800 - L. Basilio & Z. Rizzo LEFT Tent #10
- 1950 - Returned to Tent #10 - EGEG Personnel
- 2015 - SC-39408 -T
Triwall #04381 Part# 904 Tent # 8 Stack C
Shelby tube collected w/ sledge hammer
Remainder of sample collected w/ chisel & maul
- 2040 - SC-40408 -T
Triwall #03882 Part# 904 Tent # 8 Stack C
Shelby tube collected w/ sledge hammer
Remainder of sample collected w/
- 1115 - EGEG Personnel & J. Templeton out of Permanon
J. Templeton kept notes 2nd shift.
- 1225 - 4th & 5th Triwalls removed from Permanon
- 1445 - LEFT Tent #10
- 1500 - LEFT TRAILER
- END —

NATURE



CLOSED TO AND UNDERSTOOD BY

DATE

1-20-92

DATE

WITNESS

DATE

TITLE

1/21/92 (Cont.)

PROJECT NO.

159

BOOK NO.

Work continued from Page

1245 Crew setting up to enter Permocan

1310 Crew entering Permocan

Triwall 04440
 Pad 904
 Test
 Stock

Shelby tube pushed in with forklift moderately easy

1320 Sample SC-424XX-T (04440)

use shovel + trowel to sample

1345 Crew exiting Permocan

2nd shirt enter tent #10 1545 hrs

- Prep to enter Permocan - DON PPE
- Will collect 8

1) Rinse blank

2) Field blank

2) Routine Triwall samples E

1) Duplicate

- 2 Triwalls in Permocan @ Start

10 - EG & G Personnel entered Permocan

515 - Collected SC-424XX-T-F

625 - Start collecting SC-435XX-T E SC-435XX-T-D

Shelby Tube collected w/ sidecar hammer

Remainder of sample collected w/ S.S. Spoon

Triwall # 3287 PAO # 750 TENT # — STOCK

SCIENTIFIC BINDERY PRODUCTION CHICAGO 60605

Work continued to Page

GNATURE

DATE

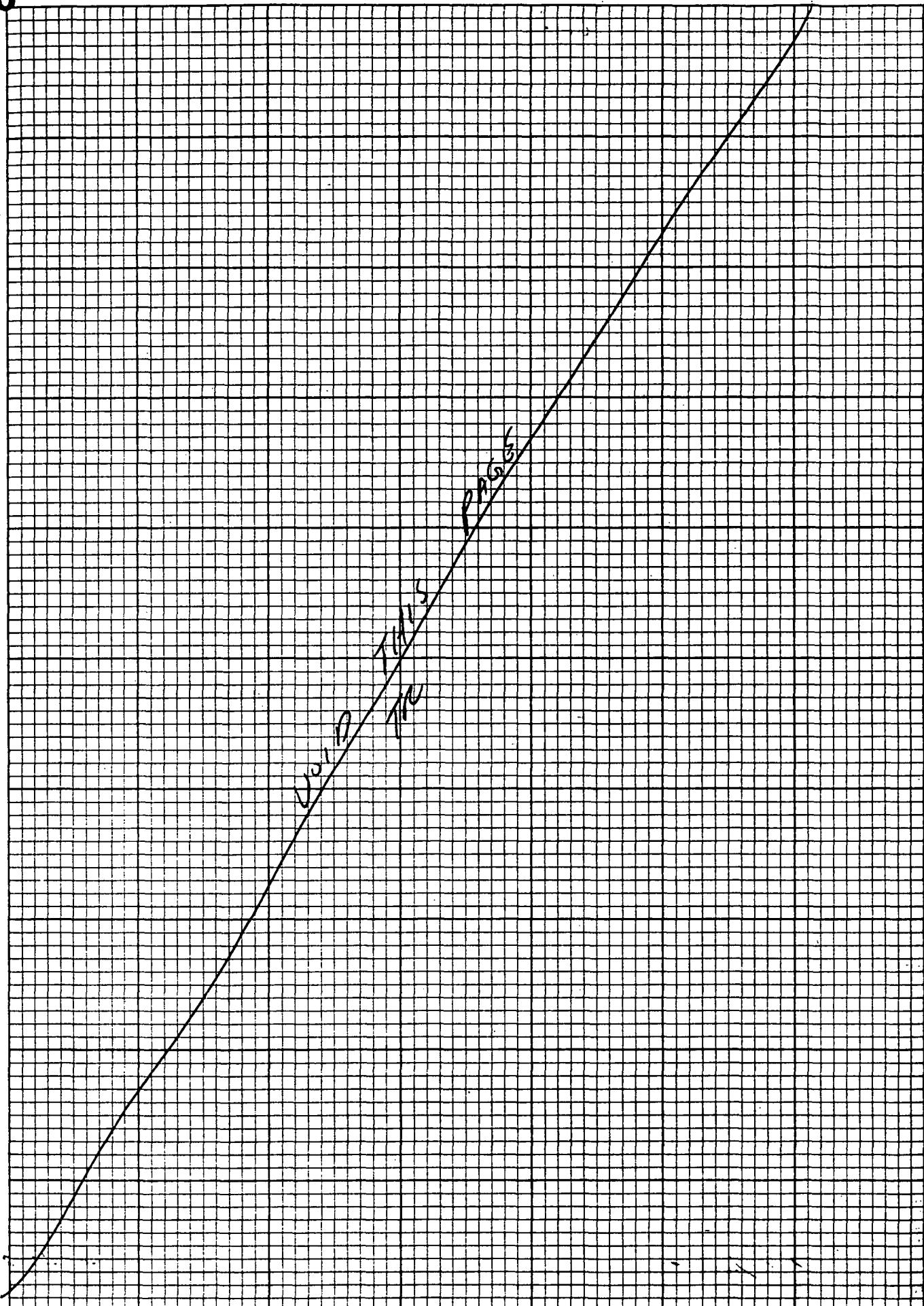
01-21-91

CLOSED TO AND UNDERSTOOD BY

DATE

WITNESS

DATE



TITLE

PROJECT NO.

161

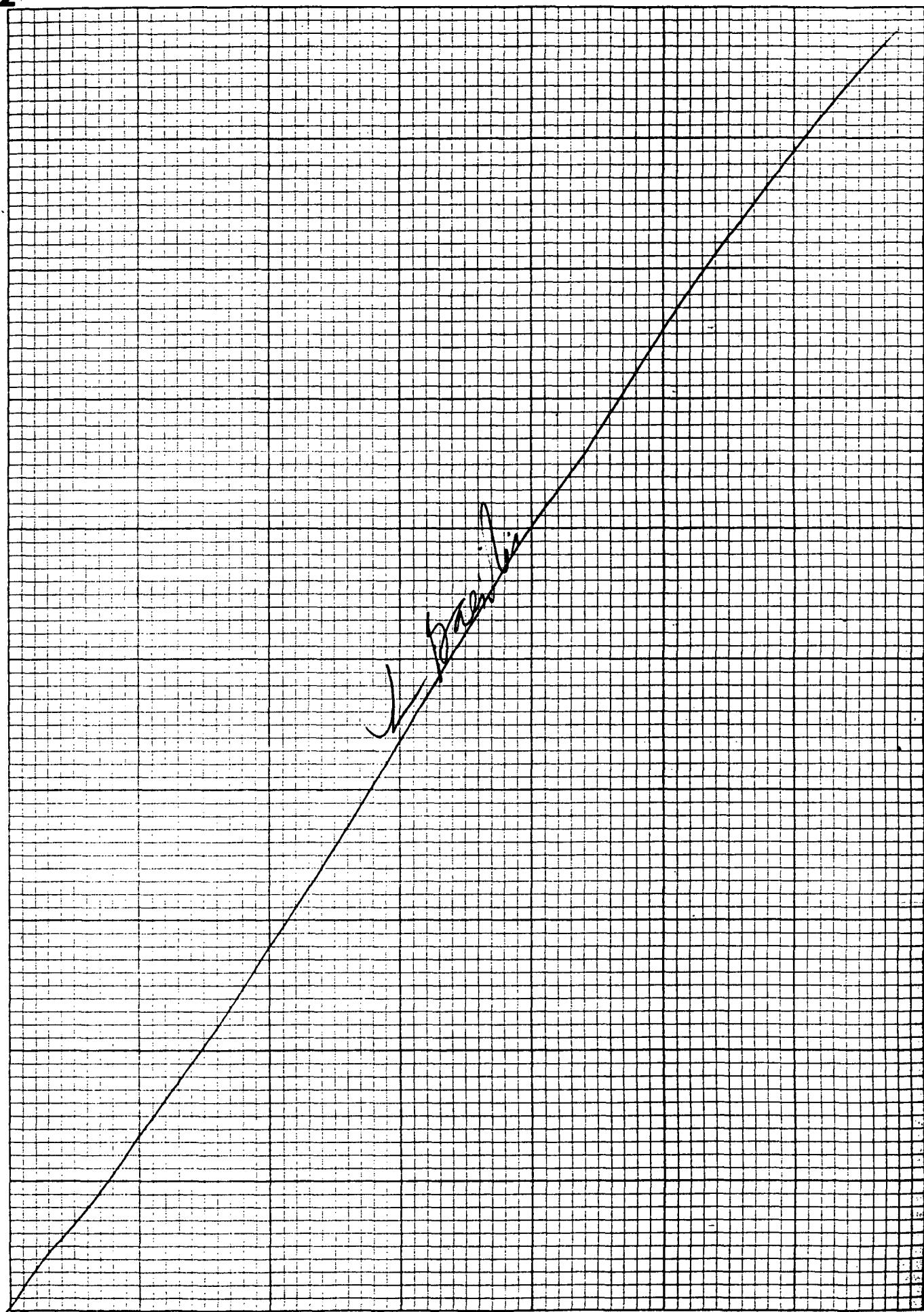
01/21/92 (Cont'd)

BOOK NO.

Work continued from Page

- 1635 - Started collecting SC-445XX-T
Thiwall #3093 Pad #750 Tent # - stack -
Shelby tube collected w/ sledge hammer
Remaining sample collected w/ s.s. spoon
- 1700 - Collected Rinsate SC-445XX-T-B
- 1715 - E.G.E.G out at Pernacum
- 1745 - E.G.E.G Lunch Break
- 1805 - LEFT TENT #10; T. Novak & L. Basilio
- 1900 - Return to Tent #10 to package uncollected samples
Coolers 1 → 13 had three (3) cans each &
Cooler 14 had four (4) cans
- 1900 - Finish packing above - LEFT Tent #10
- 1905 - LEFT Tent

END



TITLE

1/22/92

PROJECT NO.

163

BOOK NO.

Work continued from Page

0700 Larry Basilio arrives at site. Dresses out for entry to QD4 prod.

0800 Begin packaging coolers w/ samplers
fill 45 coolers w/ samplers
weigh + size coolers

1020 3 coolers are "hot" Will transfer cans out
of these to new "clean" coolers

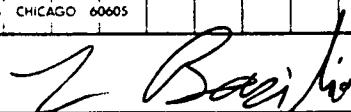
1230 Paperwork signed off on. Truck picks up coolers

1400 Leave site

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE



DATE

1/22/92

DISCLOSED TO AND UNDERSTOOD BY

DATE

WITNESS

DATE

Vol. 10
1965
Page

1-27-92

Work continued from Page

0700 L Basilio arrives at site. Dresses up into
O.D. clothing

Foreman Jerry Ostroebel sits salting bricks

Will sample Saltcrete half crates this week. Carpenters
have to remove and reapply lids to the half crates.
HNGS informed that carpenters will not arrive until
this afternoon.

1000 Remove metal firewall M01115 from Permocan
to accommodate half crates

1015 Load 4 half crates into Permocan. Two enter
Permocan to move half crates on the inside

(1) H03463	750 Pd
(2) H00264	750 Pd
(3) H00110	750 Pd
(4) 776-A-5560	750 Pd

1045 Carpenters arrive and begin dressing out to
enter Permocan. Cut 1 hole in each half crate

1210 Cut salting up to enter Permocan and sample
half crates

1230 (new enters Permocan)

1245 Sample SC-458XX-H and SC-458XX-H-O
(PC 804 776-A-5560)

L Basilio

1/27/92

Void This Page

TITLE

PROJECT NO.

167

01/27/92 (Cont)

BOOK NO.

Work continued from Page

Sample is very hard. Unable to pound a shelly tube into block. Collect 3 extra jars.

Use hammer + chisel to collect sample

1300 Collect Typ block SC-455XX-T-T-

1340 Collect SC-465XX-H

Ability to hammer shelly tube Ø 6". Take 3 additional bottles instead.

Use hammer + chisel to collect sample

ID# - 7418-00032 Building 374 12-15-89

1400 Crew cleaning up, exiting Permacon
for shift change

1600 Hrs - 2nd SHIFT ENTER TENT #10

- Proc for Permacon Entry - Dry Ppt

- (2) ½ crates already in Permacon to be sampled

1615 Hrs - T. Rojano - Ppt SC-965XX-H-T-W - LGB Prepared Trip Blocks

1625 Hrs - 2 PERSONS started SC-475XX-H

$\Sigma = 100264$ Ppt# 750 Sampler C. Goetz

Sample collected w/ chisel, mallet & chisel planes

< 1630 Hrs - 2 PERSONS started SC-485XX-H

$\Sigma = 103453$ Ppt# 750 Sampler K. Williams

Sample collected w/ drill, chisel & mallet

1700 Hrs - Removed 1st SHIFT's ½ crates to surface covers

1720 • $\approx 2' \times 2'$ HOLE cut in top of ½ crates - Random \rightarrow OR

• When sampling is completed the holes are tapped closed

• ½ crates are then set outside FOR A NEW COVER TO BE GLUED & NAILED ON.

SCIENTIFIC BINDERY PRODUCTION CHICAGO 60605

Work continued to Page

SIGNATURE

DATE

01/27/92

DISCLOSED TO AND UNDERSTOOD BY

DATE

WITNESS

DATE

Vote this
year

01-27-92 (Cont)

- 1800 Hrs - 3rd & 4th 1/2 crates removed from Permacon
- 1805 Hrs - Prepared Field Blank SC-485XX-H-F ^{Prep. by}
1810 Hrs - " Rinsate Blank SC-485XX-H-B ^{S.R. Williams}
- 810 → 1816 Hrs - Placed (4) new 1/2 crates inside Permacon
- 1750 → (4) EG&G Personnel out of Permacon (R. Williams & Helton
remained to take Field & Rinsate Blanks and
handle new 1/2 crates; Also, assist carpenters)
- 1825 Hrs - (2) carpenters ~~walked~~ entered permacon to cut holes
in top of (4) new 1/2 crates.
- 1850 Hrs - All Personnel out of Permacon
- 1855 Hrs - LEFT TENT#10 - EG&G Personnel to go on Lunch Break
- 2000 Hrs - Return to Tent #10
- 2011 Hrs - Started entry to Permacon (5 member crew)
- 2020 - Started Sampling - SC-495XX-H
1/2 crate # 03202 PAP# 750 C. Gutz Sampler
Sampled w/ mallet & chisel
- 2025 - Started Sampling SC-505XX-H
1/2 crate # 00198 PAP# 750 D. Proter Sampler
Sampled w/ mallet & chisel
- 2105 - Removed 1/2 crate # 03202 from Permacon
- 2115 - ~~Part of~~^{2 members} EG&G Crew Exist Permacon (3) remain to handle new 1/2 crates
- 2120 - " 1/2 crate # 00198 " "
- 2140 - Placed (2) new 1/2 crates in Permacon
- 2140-2155 - Carpenters cut holes in top of 2 new 1/2 crates
- 2155 - All Personnel out of Permacon
- 2208 - LEFT TENT#10
- 2215 - LEFT 904 Trailer

Tony Nagle

01/27/92

170

1-28-92

- 0700 Larry Basilio arrives at site. Dresses out into
DOE clothes.
- 0745 Crew dressing out to enter Permanan.
4 half crates are inside and open - ready for
sampling.
- 0820 J Schmidt arrives to inspect operation. Inform
LB that HNUS personnel will be in Houston for meeting
Give phone # to react in case of problems
713-267-9530.
- 0825 Crew enters Permanan. Clean up inside and
decon equipment prior to sampling
- | | | |
|-----------------|---------|---------|
| 1st - 748-00466 | B1d 374 | 4-30-91 |
| | Pad 750 | |
- 0900 Sample SC-515XX-H
Sample very hard. Unable to use shelly tube.
Used hammer - chisel to obtain sample
- Crew cleans up and dresses prior to next sample.
Material is so hard that it chips and shatters debris
about the Permanan
- 0935 Begin work on 2nd half crate
- | | | |
|------------------|---------|---------|
| 2nd - 776-A-6189 | B1d 374 | 6-28-89 |
| | Pad 750 | |

2 Basilio

1/28/92

J. Baedeker

1-28-92 (cont)

945 Collector sample SC-525XX-H

Unable to use a shelly tube. Sample very hard.
Use hammer + chisel to collect sample.

1000 Crew exiting Permecon

1215 Crew returns to Permecon to wait up

1250 Crew enters Permecon to resume sampling

1300 Sample SC-535XX-H

Attempt to use shelly tube. Get only 8" before refusal. Will collect additional bottles instead

Use hammer + chisel to collect sample

3rd half crate - H0776-A-5441 Blg 374 6-1-89

1330 Sample SC-545XX-H¹⁸

Ab/c to drive a shelly tube 12" into crate
Use hammer + chisel to collect sample

4th crate H00277 Blg 374 4-9-90

1400 Crew exiting permecon

Waiting on carpenters to arrive to seal up half crates in Permecon and open new half crates (currently out of wood lids for half crates unknown when they will arrive)

2 Basile

1-28-92

PLACE
TAXIS
TRUCK
SHIP

01-28-92 (Cont'd)

Note: a hardened steel metal claw hammer was used during sampling of

SC - 495XX-H
 SC - 515XX-H
 SC - 525XX-H
 SC - 535XX-H
 SC - 545XX-H

Apparently one of the crew brought the item into the Permacou to assist with the breaking up of the very hard half crate blocks. Once it was determined that the hammer was not a proper sampling instrument in stainless steel, its use was discontinued.

1600 Hrs - 2nd SHIFT ENTER TENT #10

* Prep to enter Permacou - Don PPE

1610 Hrs - EG&G Personnel Entered Permacou

* tape plastic OVER $\frac{1}{2}$ crates with holes cut on top (Approved by RPT's) so as to prep for removal from the permacou.

1644 Hrs - Last sampled $\frac{1}{2}$ crate removed from Permacou

1651 Hrs - Placed 1st new $\frac{1}{2}$ crate in Permacou.

1655 Hrs - Carpenter sawed hole in top of 1st $\frac{1}{2}$ crate

1658 Hrs - SC - 555XX-H - began sampling

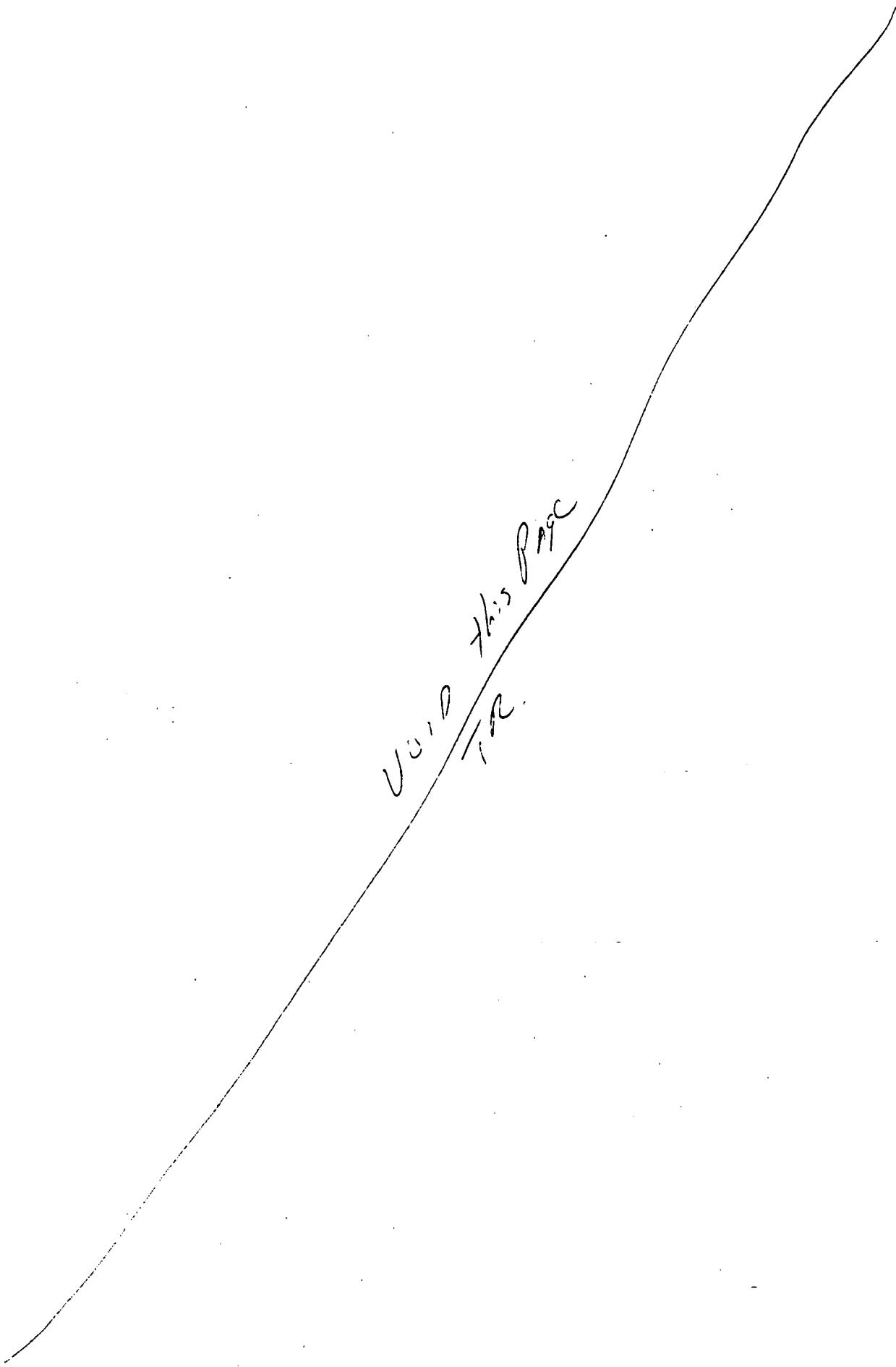
$\frac{1}{2}$ CRATE II AC35C9 PBD 750 SANJEN A. FERNANDEZ
 EQ. USED - mallet & chisel & drill

1703 Hrs - Placed 2nd and 1st $\frac{1}{2}$ crete inside Permacou

1711 Hrs - Carpenter sawed hole in top of 2nd $\frac{1}{2}$ crete.

Tony Ricciard

01/28/92



01-2E-42 (cont.)

- 1715 Hrs - Begain Sampling SC-565XX-H
 1/2 crate # H03211 PAO# 750 Sampler D. King
 EG. USED - ~~hammer~~, chisel & mallet
 SAMPLE ~~from~~ composite part in 2nd 55 gal Drum.
- 1800 Hrs - All Personnel out of Permacen
- 1815 Hrs - " " " Tent #10
- 2020 Hrs - Return to Tent #10
 EG & G personnel prep. to enter Permacen - Don PPE
- 2035 Hrs - EG & G personnel Enter Permacen
- 2045 Hrs - Removed 1/2 crates from Permacen
 to 2055 Hrs
- 2100 Hrs - Placed metal container # M00661 in Permacen
 w/ two tri-walls # 02739 & # 02804 ACC DATE 3-23-87
- 2105 Hrs - SC-57408 - M
 Triwall # 02739 PAO# 904 TENT # 8 STACK Q
 Shelly tube - collected w/ sledge hammer
 remainder of samples collected w/ chisel & spoon
 Sampler R. Williams
- 2115 Hrs - SC-58408 - M
 Triwall # 02804 PAO# 904 TENT # 8 STACK Q
 Shelly tube - collected w/ sledge hammer
 remainder of sample collected w/ chisel & spoon & S.S. shovel
 Sampler R. Williams
- 2147 Hrs - Each Personnel out of Permacen
- 2225 Hrs - S. Williams & T. Johnson out of Tent #10
- 2230 Hrs - LEFT TRAILER
-
- END

Tony Johnson

01-2E-42

U.S.D. THIS
TRUCK

1-29-92

- 0700 L Basilio arrives onsite. Change into DOC clothes
Foreman Gary Dziedzik gives safety briefings
- 0800 Begin packaging samples
Samples to be sent by Airborne Express
Hawker-Siddeley A104
- 1015 Finish packing and weighing coolers. Wait on
carpenters to band pallets.
41 coolers of samples shipped by
Airborne Express # 20330
- 1030 Carpenters arrive to band coolers to pallets
- 1300 - L Basilio to HNUS office. Contact Paul Franks
to inform him of sample shipment. P.F. indicates
that it will be no problem to ship last two
silcrete samples on Thursday for Friday delivery.
Samples can also arrive Saturday if needed. Contact
P.F. with details.
- L Basilio delivers letter to Norm Sandlin at 604 131
- 1345 Talk to Dean Person about sampling silcrete
tonight or tomorrow morning and shipping it
tomorrow. All depends on when last metal container
arrives at 750 pad
- 1300 - T-REJAHN ARRIVED AT 904 PAD
to wait on metal delivery to Tent #10
- 2140 - Metal container not delivered - LEFT TRAILER (@ 904 PAD)

EENDTerry Ngai

1/29/92

1-30-92

0700 L Basilio arrives site. Dresses out in DOL clothes
Foreman Jerry Ostroboth signs daily briefings

0745 Crew dressing out to enter Vermilion
1 metal container with 3 saltcrete triwills
placed in Vermilion last night

0815 Collect Trip Blank SC-595XX-M-T

0820 Crew enters Vermilion

Container M00424 Rat 750

Triwills 748-03257
748-3226

0830 Sample SC-595XX-M

Triwill 748-03257 7-21-89

Use shillby tube to collect sample. Pushed in
easily with hammer
Material is powdery. Use shovel to collect samples

0845 Sample SC-605XX-M

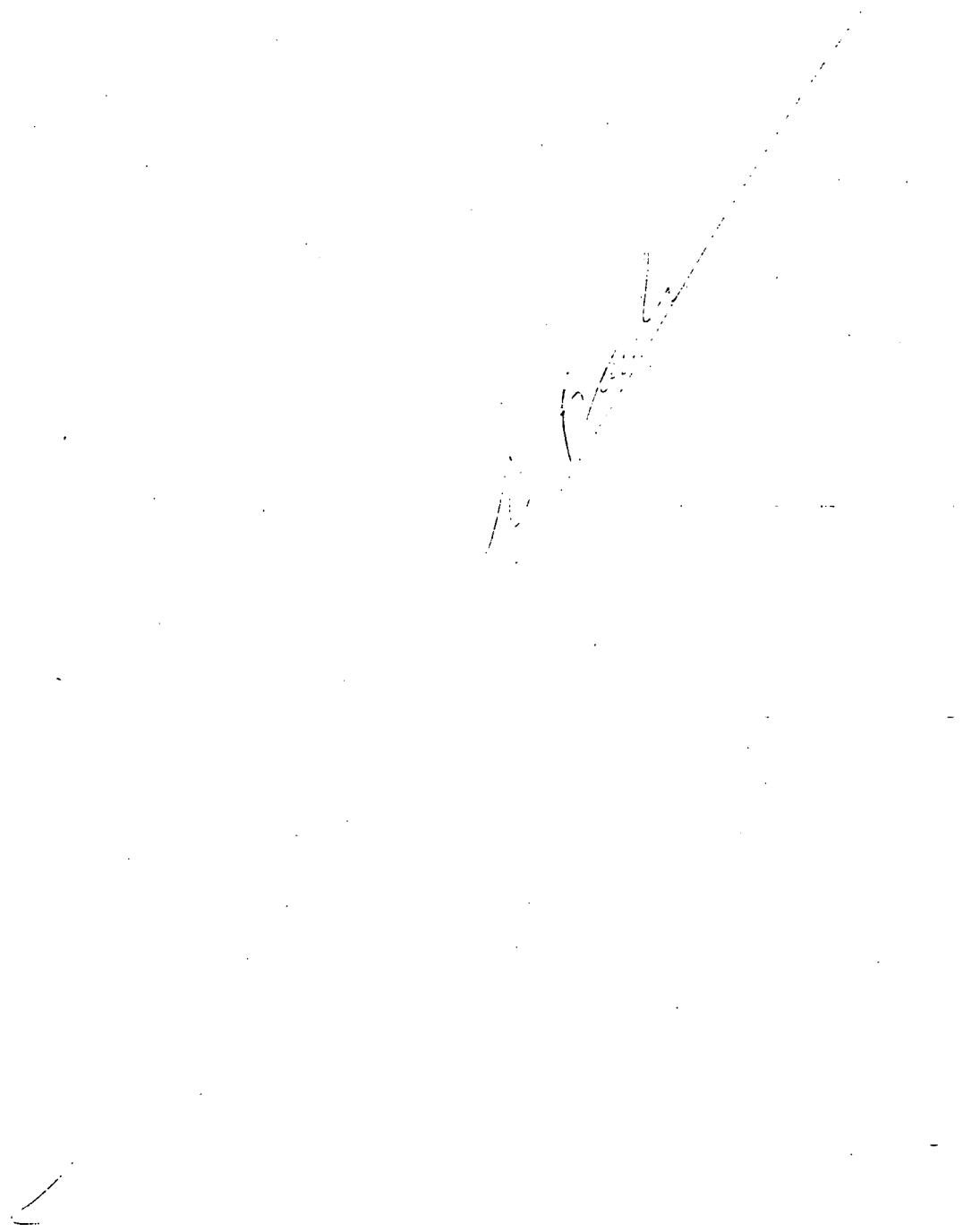
hammer shillby tube into saltcrete. Use shovel to
collect sample. Material is powdery to clumpy

748-3226 7-12-89

900 Begin packaging samples

A
1000

1-3-92

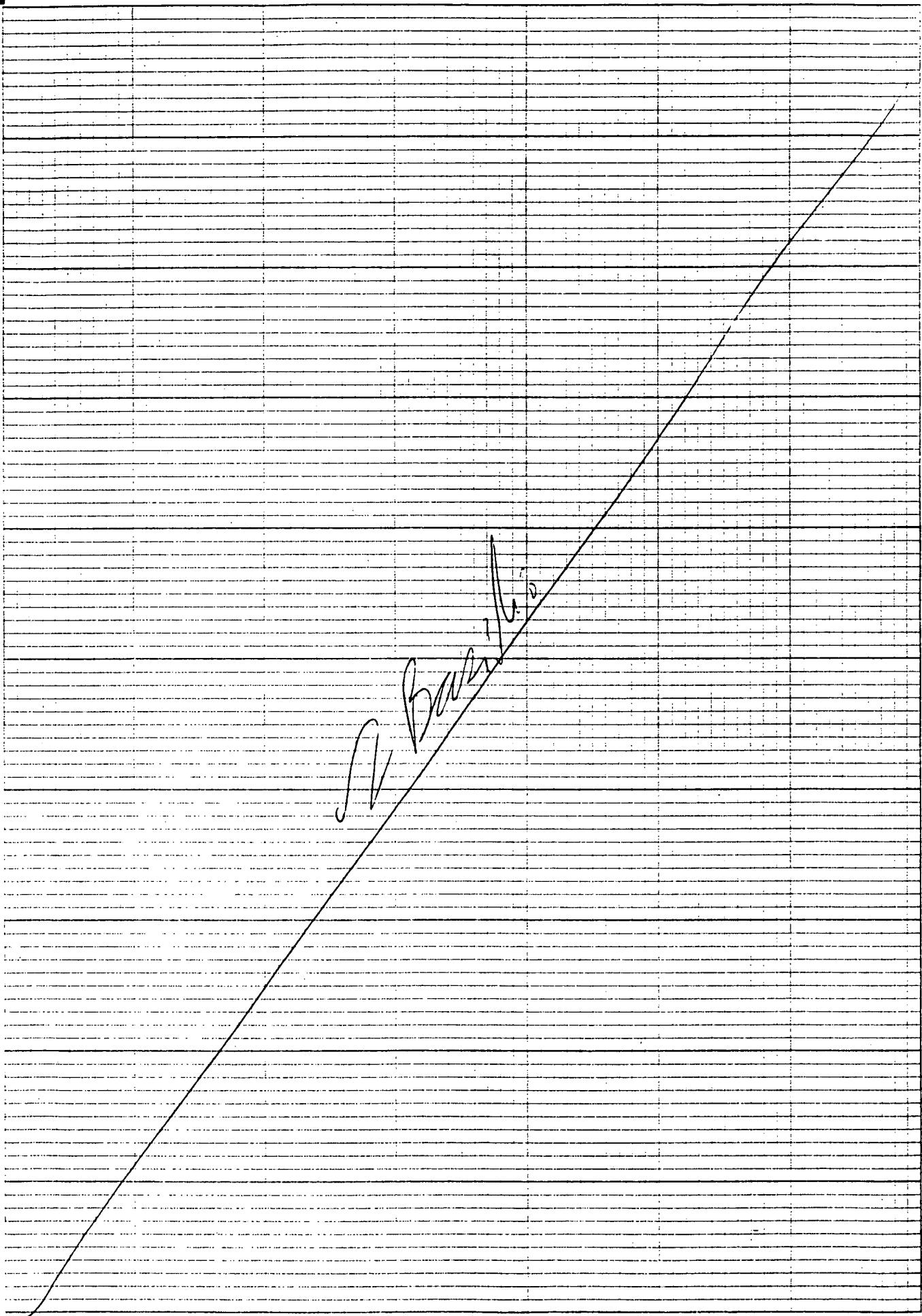


Work continued from Page

1000 Crew leaves Tent 10

5 Coolers shipped by airbone Express #20332

1245 Get copies of shipping papers. Leave site



ITLE

PROJECT NO.

185

BOOK NO.

work continued from Page

3-3-92

01230 Larry Basilio and Brad Allan - LINUS

complexes arrive at site

L Basilio goes to Blk 123 to set up
desinfect bldg

L Basilio training B Allan on sampling procedures
and chain of custody procedures

Arrangs with Sean Person to meet at PAK site
to enter Blk 788 at 730 AM.

1415 Leave site

Work continued to Page

SIGNATURE

DATE

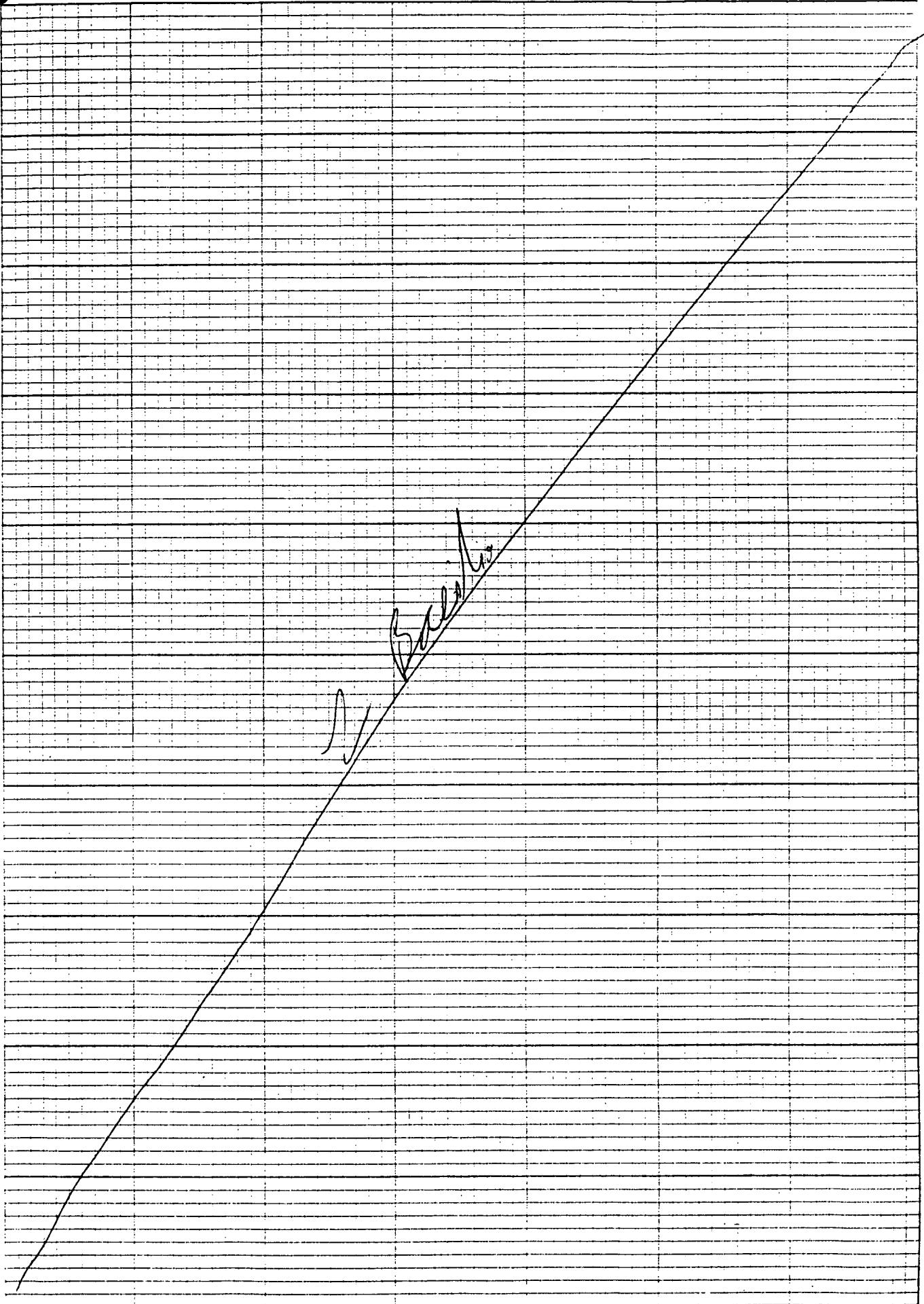
3-3-92

COPIED TO AND UNDERSTOOD

DATE

WITNESS

DATE



Work continued from Page

3-4-92

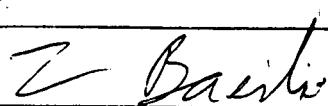
0700 L Basilio + Brad Allan arrive site and
meet Jack Templeton

0730 LB, BA, JT meet Dean Picuson at PAX
building to be escorted to 780-A

L Basilio trains G Allan on chain of custody
procedures.

Examine 2 drums at sludge for %'s of settling
Replace custody seals on 2 drums.

0845 Leave 780-A area.



3-4-92

barely

ork continued from Page

3-5-92

0700 Larry Basilio and Brad Allen arrive at 904
pad. Change into ODC clothes.

Jack Tempton ill will not be at site today

L Basilio and J Tempton discuss blending
procedure. Will empty drum into plastic sheeting on
floor and hand mix until thoroughly mixed
Ray Rodriguez since pre-evaluation briefings

0800 Crew enters Tent to dress out to enter
Permacon. L Basilio and B Allen prepare Ray
sampling of composite drums and L Basilio training
B Allen on sampling procedures

0830 Collect SC-COMP-H-T (THIR OCANH)

0840 Crew enters Permacon

0845 Begin to blend Saltcrete composite - halfcrete material

laydown plastic on floor 6'X 12'. Use
stainless shovels to empty drum to about half full
then empty drum onto floor. Physical manipulate
material using stainless shovels for 1/2 hour

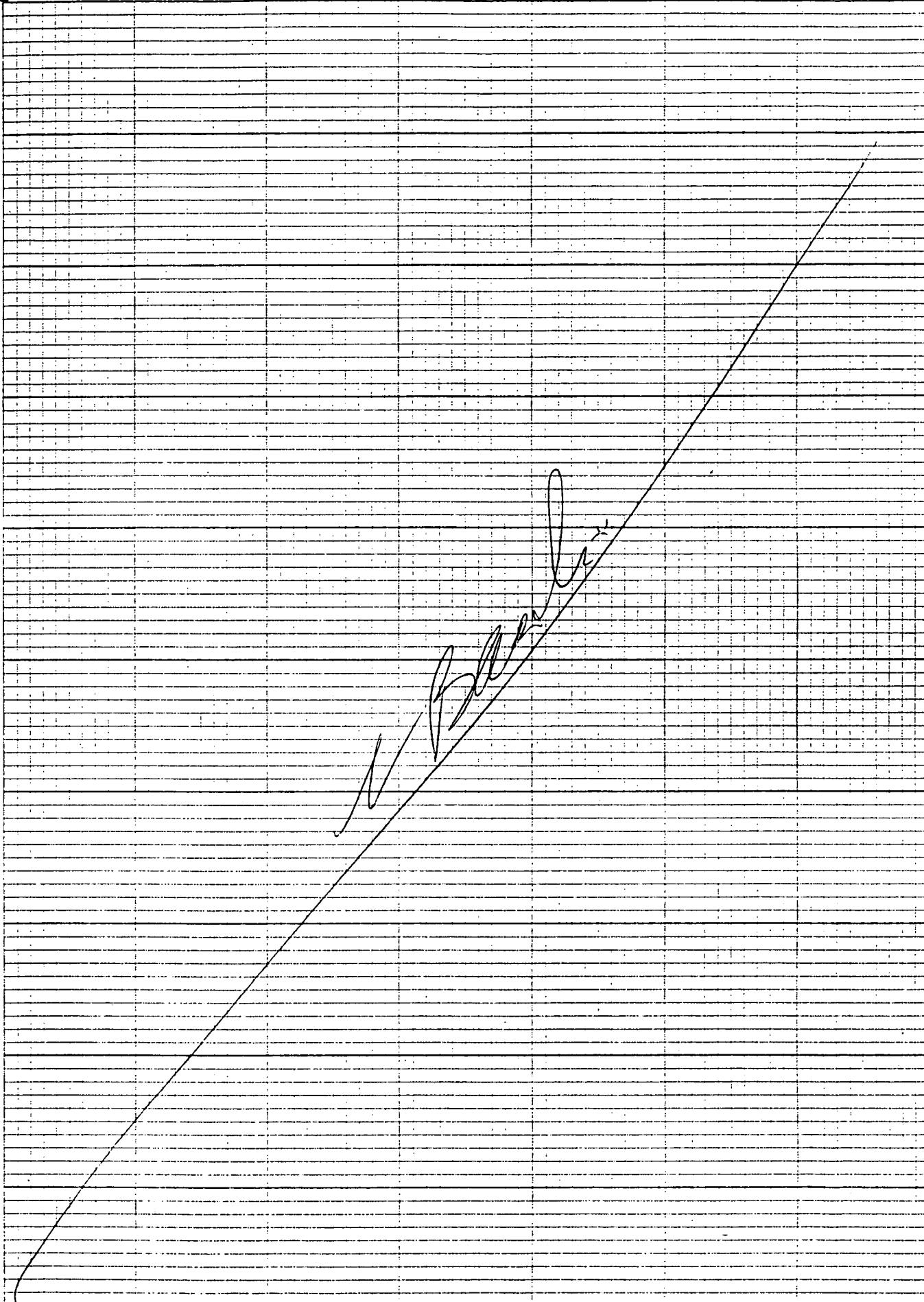
0915 Collect Sample SC-COMP-H

Begin to shovel material back into 55 gallon drum
Decon shovels + mittens.

0930 Crew departs Permacon. L Basilio and B Allen
process samples

1005 Call office to check if lab can accept saturday
delivery. Will find out later in day.

Bairns



TITLE

PROJECT NO.

193

BOOK NO.

Work continued from Page

3-6-92

0700 Larry Basilio and Brad Allan arrive at
904 trailer. Fournier, Ney Rodriguez gives pre-evolution

0800 Package samples into coolers

Authorization # 070248

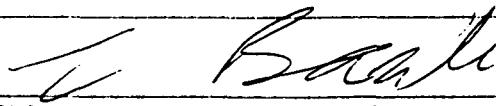
5 coolers - 15 paint cans

1100 Leave site after signing paperwork

PRINTING BINDER PRODUCTION: CHICAGO

Work continued to Page

SIGNATURE



DATE

3-6-92

DISCLOSED TO AND UNDERSTOOD:

DATE

WITNESS

DATE

3 Ollie

APPENDIX E
CHAIN OF CUSTODY FORMS

**HALLIBURTON NUS Environmental
Corporation and Subsidiaries**

CHAIN OF CUSTODY RECORD

CHAIN OF CUSTODY RECORD

2093

ALBERTON NUS Environmental
and Subsidiaries

**HATHIBURTON NUS Environmental
Corporation and Subsidiaries**

CHAIN OF CUSTODY RECORD

TRANSPORT NO:
2265

SITE NAME:

Rocky Flats Secure Area

COMPLIERS (SIGNATURE):

Dalby L. C. + G.

STATION	DATE	TIME	COMP	GRAN	STATION LOCATION	NO. OF CONTAINERS	REMARKS
1600-T	1/12/92	1300	X	SC - 15408-T	2	2	(1) CN, Metals, pH, TELL, ASTM TEST, NH ₃ , RAD, Cement, Co.
1600-T	1/12/92	1700	X	SC - 15408-T	10	1	(2) SPECIFIC GRAVITY, VISCOSEITY, THERM, PH, TELL
1600-T	1/12/92	1730	X	SC - 15408-T	10	1	ATTACHMENT LIMITS
1600-T	1/12/92	1800	X	SC - 17408-T	10	1	
1600-T	1/12/92	2020	X	SC - 185XX-T	10	1	
1600-T	1/12/92	2035	X	SC - 195XX-T	10	1	
1600-T	1/12/92	1000	X	SC - 205XX-T	10	1	
1600-T	1/12/92	1010	X	SC - 215XX-T	10	1	
1600-T	1/12/92	1015	X	SC - 225XX-T	10	1	
1600-T	1/12/92	1300	X	SC - 23408-T	10	1	
1600-T	1/12/92	1320	X	SC - 24408-T	10	1	
1600-T	1/12/92	1605	X	SC - 25408-T	10	1	
1600-T	1/12/92	1635	X	SC - 26408-T	10	1	
1600-T	1/12/92	1655	X	SC - 273XX-T	10	1	

RELINQUISHED BY (SIGNATURE):

A. S. O.

RECEIVED BY (SIGNATURE):

A. S. O.

RECEIVED BY (SIGNATURE):

A. S. O.

RECEIVED BY (SIGNATURE):

A. S. O.

RELINQUISHED BY (SIGNATURE):

A. S. O.

RECEIVED BY (SIGNATURE):

A. S. O.

RECEIVED BY (SIGNATURE):

A. S. O.

RECEIVED BY (SIGNATURE):

A. S. O.

RELINQUISHED BY (SIGNATURE):

A. S. O.

RECEIVED BY (SIGNATURE):

A. S. O.

RECEIVED BY (SIGNATURE):

A. S. O.

RECEIVED BY (SIGNATURE):

A. S. O.

RELINQUISHED BY (SIGNATURE):

A. S. O.

RECEIVED BY (SIGNATURE):

A. S. O.

RECEIVED BY (SIGNATURE):

A. S. O.

RECEIVED BY (SIGNATURE):

A. S. O.

RELINQUISHED BY (SIGNATURE):

A. S. O.

RECEIVED BY (SIGNATURE):

A. S. O.

RECEIVED BY (SIGNATURE):

A. S. O.

RECEIVED BY (SIGNATURE):

A. S. O.

RELINQUISHED BY (SIGNATURE):

A. S. O.

RECEIVED BY (SIGNATURE):

A. S. O.

RECEIVED BY (SIGNATURE):

A. S. O.

RECEIVED BY (SIGNATURE):

A. S. O.

HALLIBURTON NUS Environmental
Corporation and Subsidiaries

CHAIN OF CUSTODY RECORD

PROJECT NO.:	SITE NAME:										
2K68	ROCKY FLATS SOLAR POND				NO. OF CONTAINERS	SELECTED	SELECTED	SELECTED	SELECTED	REMARKS	
SAMPLERS (SIGNATURE): <i>L. Lewis, Jr. E6+6</i>	TIME	COMP	GRAB	STATION LOCATION		10	1	1	4	1	2
10/22 1735	X			SC-285XX-T	10	1	1	4	1	2	
10/22 1735	X			SC-29408-T	10	1	1	4	1	2	
10/22 1800	X			SC-30409-T	10	1	1	4	1	2	
RElinquished By (Signature): <i>John D. Johnson</i>	DATE / TIME:	RECEIVED BY (SIGNATURE): <i>John D. Johnson</i>				RElinquished By (Signature): <i>John D. Johnson</i>				DATE / TIME:	RECEIVED BY (SIGNATURE): <i>John D. Johnson</i>
RElinquished By (Signature): <i>John D. Johnson</i>	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE): <i>John D. Johnson</i>				DATE / TIME:	REMARKS:				

NINJA'S CORPORATION AND SUBSIDIARIES

CHAIN OF CUSTODY RECORD

CHAIN OF CUSTODY RECORD

NUIS CORPORATION AND SUBSIDAIRES

CHAIN OF CUSTODY RECORD

**HALLIBURTON NUS Environmental
Corporation and Subsidiaries**

CHAIN OF CUSTODY RECORD

ITEM / DATE	TIME	PART	TIME	COMP	SNS	STATION / LOCATION	NO. OF CONT. TAPES	REMARKS			RECEIVED BY / SIGNATURE:	DATE / TIME:	RECEIVED BY / SIGNATURE:
								1	2	3			
24.6.8	1300	X	SC - 02408-T			1.0	1	1	4	1	2	D CW; re-tape, pH.	
	1415	X	SC - 02408-T			2	-	-	-	-	-	TCLP, ASTM, TOC, NTU,	
	1425	X	SC - 03408-T			10	1	1	4	1	2	Plad cement (one	
	1425	X	SC - 03408-T (RUBBER)			7	1	1	4	-	-		
	1710	X	SC - 04408-T			10	1	1	4	1	2	Spun gravity	
	2010	X	SC - 05410-T			10	1	1	4	1	2	Virginity, Ashing, Iodine	
	2025	X	SC - 06410-T			10	1	1	4	1	2	Small test	
	2030	X	SC - 07408-T			10	1	1	4	1	2		
	2030	X	SC - 08408-T			10	1	1	4	1	2		
	1400	X	SC - 09408-T			10	1	1	4	1	2		
	1420	X	SC - 10408-T			10	1	1	4	1	2		
	1440	X	SC - 11408-T			10	1	1	4	1	2		
	1445	X	SC - 12408-T			10	1	1	4	1	2		
	1505	X	SC - 13408-T			10	1	1	4	1	2		
	1515	X	SC - 14408-T			10	1	1	4	1	2		
	1530	X	SC - 15408-T			10	1	1	4	1	2		
	1545	X	SC - 16408-T			10	1	1	4	1	2		
	1555	X	SC - 17408-T			10	1	1	4	1	2		
	1605	X	SC - 18408-T			10	1	1	4	1	2		
	1620	X	SC - 19408-T			10	1	1	4	1	2		
	1635	X	SC - 20408-T			10	1	1	4	1	2		
	1650	X	SC - 21408-T			10	1	1	4	1	2		
	1705	X	SC - 22408-T			10	1	1	4	1	2		
	1720	X	SC - 23408-T			10	1	1	4	1	2		
	1735	X	SC - 24408-T			10	1	1	4	1	2		
	1750	X	SC - 25408-T			10	1	1	4	1	2		
	1805	X	SC - 26408-T			10	1	1	4	1	2		
	1820	X	SC - 27408-T			10	1	1	4	1	2		
	1835	X	SC - 28408-T			10	1	1	4	1	2		
	1850	X	SC - 29408-T			10	1	1	4	1	2		
	1905	X	SC - 30408-T			10	1	1	4	1	2		
	1920	X	SC - 31408-T			10	1	1	4	1	2		
	1935	X	SC - 32408-T			10	1	1	4	1	2		
	1950	X	SC - 33408-T			10	1	1	4	1	2		
	2005	X	SC - 34408-T			10	1	1	4	1	2		
	2020	X	SC - 35408-T			10	1	1	4	1	2		
	2035	X	SC - 36408-T			10	1	1	4	1	2		
	2050	X	SC - 37408-T			10	1	1	4	1	2		
	2105	X	SC - 38408-T			10	1	1	4	1	2		
	2120	X	SC - 39408-T			10	1	1	4	1	2		
	2135	X	SC - 40408-T			10	1	1	4	1	2		
	2150	X	SC - 41408-T			10	1	1	4	1	2		
	2205	X	SC - 42408-T			10	1	1	4	1	2		
	2220	X	SC - 43408-T			10	1	1	4	1	2		
	2235	X	SC - 44408-T			10	1	1	4	1	2		
	2250	X	SC - 45408-T			10	1	1	4	1	2		
	2305	X	SC - 46408-T			10	1	1	4	1	2		
	2320	X	SC - 47408-T			10	1	1	4	1	2		
	2335	X	SC - 48408-T			10	1	1	4	1	2		
	2350	X	SC - 49408-T			10	1	1	4	1	2		
	2405	X	SC - 50408-T			10	1	1	4	1	2		
	2420	X	SC - 51408-T			10	1	1	4	1	2		
	2435	X	SC - 52408-T			10	1	1	4	1	2		
	2450	X	SC - 53408-T			10	1	1	4	1	2		
	2505	X	SC - 54408-T			10	1	1	4	1	2		
	2520	X	SC - 55408-T			10	1	1	4	1	2		
	2535	X	SC - 56408-T			10	1	1	4	1	2		
	2550	X	SC - 57408-T			10	1	1	4	1	2		
	2605	X	SC - 58408-T			10	1	1	4	1	2		
	2620	X	SC - 59408-T			10	1	1	4	1	2		
	2635	X	SC - 60408-T			10	1	1	4	1	2		
	2650	X	SC - 61408-T			10	1	1	4	1	2		
	2705	X	SC - 62408-T			10	1	1	4	1	2		
	2720	X	SC - 63408-T			10	1	1	4	1	2		
	2735	X	SC - 64408-T			10	1	1	4	1	2		
	2750	X	SC - 65408-T			10	1	1	4	1	2		
	2805	X	SC - 66408-T			10	1	1	4	1	2		
	2820	X	SC - 67408-T			10	1	1	4	1	2		
	2835	X	SC - 68408-T			10	1	1	4	1	2		
	2850	X	SC - 69408-T			10	1	1	4	1	2		
	2905	X	SC - 70408-T			10	1	1	4	1	2		
	2920	X	SC - 71408-T			10	1	1	4	1	2		
	2935	X	SC - 72408-T			10	1	1	4	1	2		
	2950	X	SC - 73408-T			10	1	1	4	1	2		
	3005	X	SC - 74408-T			10	1	1	4	1	2		
	3020	X	SC - 75408-T			10	1	1	4	1	2		
	3035	X	SC - 76408-T			10	1	1	4	1	2		
	3050	X	SC - 77408-T			10	1	1	4	1	2		
	3105	X	SC - 78408-T			10	1	1	4	1	2		
	3120	X	SC - 79408-T			10	1	1	4	1	2		
	3135	X	SC - 80408-T			10	1	1	4	1	2		
	3150	X	SC - 81408-T			10	1	1	4	1	2		
	3205	X	SC - 82408-T			10	1	1	4	1	2		
	3220	X	SC - 83408-T			10	1	1	4	1	2		
	3235	X	SC - 84408-T			10	1	1	4	1	2		
	3250	X	SC - 85408-T			10	1	1	4	1	2		
	3305	X	SC - 86408-T			10	1	1	4	1	2		
	3320	X	SC - 87408-T			10	1	1	4	1	2		
	3335	X	SC - 88408-T			10	1	1	4	1	2		
	3350	X	SC - 89408-T			10	1	1	4	1	2		
	3405	X	SC - 90408-T			10	1	1	4	1	2		
	3420	X	SC - 91408-T			10	1	1	4	1	2		
	3435	X	SC - 92408-T			10	1	1	4	1	2		
	3450	X	SC - 93408-T			10	1	1	4	1	2		
	3505	X	SC - 94408-T			10	1	1	4	1	2		
	3520	X	SC - 95408-T			10	1	1	4	1	2		
	3535	X	SC - 96408-T			10	1	1	4	1	2		
	3550	X	SC - 97408-T			10	1	1	4	1	2		
	3605	X	SC - 98408-T			10	1	1	4	1	2		
	3620	X	SC - 99408-T			10	1	1	4	1	2		
	3635	X	SC - 00408-T			10	1	1	4	1	2		
	3650	X	SC - 01408-T			10	1	1	4	1	2		
	3705	X	SC - 02408-T			10	1	1	4	1	2		
	3720	X	SC - 03408-T			10	1	1	4	1	2		
	3735	X	SC - 04408-T			10	1	1	4	1	2		
	3750	X	SC - 05408-T			10	1	1	4	1	2		
	3805	X	SC - 06408-T			10	1	1	4	1	2		
	3820	X	SC - 07408-T			10	1	1	4	1	2		
	3835	X	SC - 08408-T			10	1	1	4	1	2		
	3850	X	SC - 09408-T			10	1	1	4	1	2		
	3905	X	SC - 10408-T			10	1	1	4	1	2		
	3920	X	SC - 11408-T			10	1	1	4	1	2		
	3935	X	SC - 12408-T			10	1	1	4	1	2		
	3950	X	SC - 13408-T			10	1	1	4	1	2		
	4005	X	SC - 14408-T			10	1	1	4	1	2		
	4020	X	SC - 15408-T			10	1	1	4	1	2		
	4035	X	SC - 16408-T	</td									

HALLIBURTON NUS Environmental
Corporation and Subsidiaries

2 of 3

CHAIN OF CUSTODY RECORD

PROJECT NO.	SITE NAME:				NO. OF CONTAINERS	REMARKS
DATE	TIME	CORE	GRAB	STATION NUMBER		
11/12/92	1605	X		SC-03408-T	2	(1) Shallow tube -
11/12/92	1617	X		SC-03408-T	2	UCS, Bulk density,
11/12/92	1710	X		SC-04405-T	2	Petrographic analysis,
11/12/92	2010	X		SC-05410-T	3	unhydrated matrix context.
11/12/92	2015	X		SC-06410-T	2	(2) Shallow tubes A-TOP B-Bottom
11/12/92	2130	X		SC-07415-T	2	
11/12/92	1930	X		SC-08408-T	2	
11/12/92	1930	X		SC-09408-T	2	
11/12/92	1930	X		SC-10408-T	2	
11/12/92	2020	X		SC-11408-T	2	
11/12/92	2120	X		SC-12408-T	2	
11/12/92	2125	X		SC-13408-T	2	
11/12/92	2135	X		SC-14408-T	2	

DISPENSED BY(SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):	RELINQUISHED BY(SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
DR. J. MCGEEhan	11/12/92 1600	J. COOPER	DR. J. MCGEEhan	11/12/92 1600	J. COOPER

THIS CORPORATION AND SUBSIDIARIES

CHAIN OF CUSTODY RECORD

PRODUCT ID#:

3168

SHIP NAME:

KURE ISLAND

DUMPING (SIGNATURE):

John Doe

REMARKS:

DATE / TIME:

10/14/04 10:00 AM

CUSTODIAN:

John Doe

STATION / LOCATION:

KURE ISLAND

NO. OF CONTAINERS:

4

DATE / TIME:

10/14/04 10:00 AM

CUSTODIAN:

John Doe

STATION / LOCATION:

KURE ISLAND

NO. OF CONTAINERS:

4

DATE / TIME:

10/14/04 10:00 AM

CUSTODIAN:

John Doe

STATION / LOCATION:

KURE ISLAND

NO. OF CONTAINERS:

4

DATE / TIME:

10/14/04 10:00 AM

CUSTODIAN:

John Doe

STATION / LOCATION:

KURE ISLAND

NO. OF CONTAINERS:

4

DATE / TIME:

10/14/04 10:00 AM

CUSTODIAN:

John Doe

STATION / LOCATION:

KURE ISLAND

NO. OF CONTAINERS:

4

DATE / TIME:

10/14/04 10:00 AM

CUSTODIAN:

John Doe

STATION / LOCATION:

KURE ISLAND

NO. OF CONTAINERS:

4

DATE / TIME:

10/14/04 10:00 AM

CUSTODIAN:

John Doe

STATION / LOCATION:

KURE ISLAND

NO. OF CONTAINERS:

4

DATE / TIME:

10/14/04 10:00 AM

CUSTODIAN:

John Doe

STATION / LOCATION:

KURE ISLAND

NO. OF CONTAINERS:

4

DATE / TIME:

10/14/04 10:00 AM

CUSTODIAN:

John Doe

STATION / LOCATION:

KURE ISLAND

NO. OF CONTAINERS:

4

RECEIVED BY (SIGNATURE):

John Doe

REMOVED BY (SIGNATURE):

John Doe

RECEIVED BY (SIGNATURE):

John Doe

REMOVED BY (SIGNATURE):

John Doe

NUS CORPORATION AND SUBSIDAIRES

CHAIN OF CUSTODY RECORD

卷之三

NUS CORPORATION AND SUBSIDIARIES

CHAIN OF CUSTODY RECORD

Z of 41

PROJECT NO.: 2K68
SITE NAME: ROCKY FLATS POLAROID

CHIEF SIGNATURE:

NO.

SUBSIDIARY

RECEIVED BY (SIGNATURE)

DATE / TIME

REMOVED FROM (SIGNATURE)

REMOVED FOR (NATURE)

REMOVED BY (SIGNATURE)

REMOVED ON (DATE)

REMOVED TO (LOCATION)

REMOVED BY (SIGNATURE)

REMOVED ON (DATE)

REMOVED TO (LOCATION)

REMOVED BY (SIGNATURE)

REMOVED ON (DATE)

REMOVED TO (LOCATION)

REMOVED BY (SIGNATURE)

REMOVED ON (DATE)

REMOVED TO (LOCATION)

REMOVED BY (SIGNATURE)

NUS CORPORATION AND SUBSIDIARIES

CHAIN OF CUSTODY RECORD

3064

PROJECT NO.: 2X68

STATION NO.: 100

RECEIVED

DATE RECEIVED:

2015-07-14

REMARKS:

(1)

(2)

(3)

(4)

(5)

(6)

(7)

(8)

(9)

(10)

(11)

(12)

(13)

(14)

(15)

(16)

(17)

(18)

(19)

(20)

(21)

(22)

(23)

(24)

(25)

(26)

(27)

(28)

(29)

(30)

(31)

(32)

(33)

(34)

(35)

(36)

(37)

(38)

(39)

(40)

(41)

(42)

(43)

(44)

(45)

(46)

(47)

(48)

(49)

(50)

(51)

(52)

(53)

(54)

(55)

(56)

(57)

(58)

(59)

(60)

(61)

(62)

(63)

(64)

(65)

(66)

(67)

(68)

(69)

(70)

(71)

(72)

(73)

(74)

(75)

(76)

(77)

(78)

(79)

(80)

(81)

(82)

(83)

(84)

(85)

(86)

(87)

(88)

(89)

(90)

(91)

(92)

(93)

(94)

(95)

(96)

(97)

(98)

(99)

(100)

(101)

(102)

(103)

(104)

(105)

(106)

(107)

(108)

(109)

(110)

(111)

(112)

(113)

(114)

(115)

(116)

(117)

(118)

(119)

(120)

(121)

(122)

(123)

(124)

(125)

(126)

(127)

(128)

(129)

(130)

(131)

(132)

(133)

(134)

(135)

(136)

(137)

(138)

(139)

(140)

(141)

(142)

(143)

(144)

(145)

(146)

(147)

(148)

(149)

(150)

(151)

(152)

(153)

(154)

(155)

(156)

(157)

(158)

(159)

(160)

(161)

(162)

(163)

(164)

(165)

(166)

(167)

(168)

(169)

(170)

(171)

(172)

(173)

(174)

(175)

(176)

(177)

(178)

(179)

(180)

(181)

(182)

(183)

(184)

(185)

(186)

(187)

(188)

(189)

(190)

(191)

(192)

(193)

(194)

(195)

(196)

(197)

(198)

(199)

(200)

(201)

(202)

(203)

(204)

(205)

(206)

(207)

(208)

(209)

(210)

(211)

(212)

(213)

(214)

(215)

(216)

(217)

(218)

(219)

(220)

(221)

(222)

(223)

(224)

(225)

(226)

(227)

(228)

(229)

(230)

(231)

(232)

(233)

(234)

(235)

(236)

(237)

(238)

(239)

(240)

(241)

(242)

(243)

(244)

(245)

(246)

(247)

(248)

(249)

(250)

(251)

(252)

(253)

(254)

(255)

(256)

(257)

(258)

(259)

(260)

(261)

(262)

(263)

(264)

(265)

(266)

(267)

(268)

(269)

(270)

(271)

(272)

(273)

(274)

(275)

(276)

(277)

(278)

(279)

(280)

(281)

(282)

(283)

(284)

(285)

(286)

(287)

(288)

(289)

(290)

(291)

(292)

(293)

(294)

(295)

(296)

(297)

(298)

(299)

(300)

(301)

(302)

(303)

(304)

(305)

(306)

(307)

(308)

(309)

(310)

(311)

(312)

(313)

(314)

(315)

(316)

(317)

(318)

(319)

(320)

(321)

(322)

(323)

(324)</div

NUIS CORPORATION AND SUBSIDIARIES

STI NAME: Rock
PROJECT NO.: 2K69

Signers (Signature):

四

四
四

CHAIN OF CUSTODY RECORD

VIVUS CORPORATION AND SUBSIDIARIES

CHAIN OF CUSTODY RECORD

**WILBURTON NUS Environmental
Report and Subsidies**

2012

CHAIN OF CUSTODY RECORD

INUS CORPORATION AND SUBSIDIARIES

۳۹۷

CHAIN OF CUSTODY RECORD

**HALLBURTON NUS Environmental
Corporation and Subsidiaries**

4. f. 4

CHAIN OF CUSTODY RECORD

PROJECT NO:	SITE NAME:	STATION LOCATION				NO. OF CONTAINERS	REMARKS
STATION NO.	DATE	TIME	COMP	EMB			
1/1/68	1/1/68	X	SC-31XX-T	2	1	(1) Shallow tube -	
1/1/68	1/1/68 900	X	SC-325XX-T	2	1	(1) CS built during	
1/1/68	1/1/68 915	X	SC-33XX-T	2	1	construction of building	
1/1/68	1/1/68 940	X	SC-34XX-T	2	1	Vehicle is shallow tube	
1/1/68	1/1/68 1015	X	SC-355XX-T	2	1	1/1/68 shallow tube - same	
1/1/68	1/1/68 1010	X	SC-3C408-T	2	1	(1) 1/32/92 J.A. - same	
1/1/68	1/1/68 1055	X	SC-37408-T	2	1	(1) 4/2/92, (1) 5/2/92	
1/1/68	1/1/68 1700	X	SC-38408-T	2	1	Shallow tube - same	
1/1/68	1/1/68 2005	X	SC-39408-T	2	1	parameters.	
1/1/68	1/1/68 2040	X	SC-40408-T	4	-	1 3	
1/1/68	1/1/68 2045	X	SC-41408-T	2	1		
1/1/68	1/1/68 2020	X	SC-424XX-T	2	1		
1/1/68	1/1/68 1625	X	SC-435XX-T	2	1		
1/1/68	1/1/68 1635	X	SC-445XX-T	2	1		
RElinquished by (Signature):				RECEIVED BY (Signature):		DATE / TIME:	RECEIVED BY (Signature):
RElinquished by (Signature):				RECEIVED FOR LABORATORY BY (Signature):		DATE / TIME:	RECEIVED BY (Signature):
RElinquished by (Signature):				RECEIVED BY (Signature):		DATE / TIME:	RECEIVED BY (Signature):
RElinquished by (Signature):				RECEIVED BY (Signature):		DATE / TIME:	RECEIVED BY (Signature):

CHAIN OF CUSTODY RECORD

**HALLIBURTON NUS Environmental
Corporation and Subsidiaries**

CHAIN OF CUSTODY RECORD

PROJECT NO.:	SITE NAME:				NO. OF CONTAINERS	VOL	DNA	P/LIST	REMARKS	
2468	Rocky Flats Solar Panels									
SAMPLERS (SIGNATURE):	<i>L. Basile C. Chabot</i>									
STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION					
1	3/15/98	0830	X		Trip Blank	2	2		① metals, pH, TCCP	
2	3/15/98	0915	X		SC-COMP-H composite of waste materials	7	1	1	4	ASTM, TDC, NH ₃ ,
3	3/15/98	1330	X		SC-COMP-M composite of metals	7	1	1	4	Lead, Icomat (cont.)
4	3/16/98	1705	X		SC-COMP-T composite of tailings	7	1	1	4	
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):			RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):			
<i>L. Basile</i>	3/16/98 0830	A. H. SOARES 07-248								
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):			RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):			
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):			DATE / TIME:	REMARKS:				

APPENDIX F

**CALCULATIONS TO DETERMINE
IF RCRA STANDARDS ARE EXCEEDED**

CLIENT: Rocky Flats	FILE NO.: 2K68 224	BY: RMN	PAGE 1 OF 6
SUBJECT: Halogenates - CN, Amenable (Salterate Charac.)		CHECKED BY: MPS	DATE: 7-21-92

LDR Standard = 30 mg/kg

2/3 samples > standard

Data with Negative Values

$$\bar{x} = -0.054$$

$$s = 30.74$$

Negative Values Changed to 0

$$\bar{x} = 12.87$$

$$s = 19.42$$

$$n = 13$$

$$n-1 = 12$$

$$t_{.20} = 1.356$$

1. Calculate Confidence Interval

$$CI = \bar{x} \pm t_{.20} s_x \quad \text{where } s_x = \frac{s}{\sqrt{n}} = \frac{19.42}{\sqrt{13}} = 5.39$$

$$CI = 12.87 + (5.39)(1.356) = 20.17 \text{ mg/kg}$$

which is less than 30 mg/kg,
therefore, the halogenate population
as a whole does not exceed the LDR
standard.

2. Check Number of Samples

$$n = \frac{t^2 s^2}{\Delta^2} \quad \text{where } \Delta = RT - \bar{x}$$

$$\bar{x} < s^2 \quad \text{therefore, must use arcsin transformation}$$

$$RT = \frac{30}{30} = 1$$

$$\bar{x} = \frac{12.87}{30} = 0.429$$

$$s = \frac{19.42}{30} = 0.647 \quad \text{arcsin} = 40.34$$

$$\Delta = 1 - 0.429 = 0.571 \quad \text{arcsin} = 34.82$$

$$n = \frac{(1.356)^2 (40.34)^2}{(34.82)^2} = 2.5$$

which is less than the 13 samples collected.
Therefore, the sample size was adequate
to characterize the waste.

CLIENT: Rocky Flats	FILE NO.: ZK68 224	BY: RAN	PAGE 2 OF 6
SUBJECT: Triwalls - Cd, TCLP (saltcrete Charac.)		CHECKED BY: MPS	DATE: 7-21-92

LDR standard = 66 $\mu\text{g/l}$

3/42 Samples > Standard

$$\bar{x} = 16.9 \mu\text{g/l}$$

$$n = 42$$

$$s = 24.6$$

$$n-1 = 41 \quad t_{.20} = 1.303$$

1. Calculate Confidence Interval

$$CI = \bar{x} \pm t_{.20} s_{\bar{x}}$$

$$\text{where } s_{\bar{x}} = \frac{s}{\sqrt{n}} = \frac{24.6}{\sqrt{42}} = 3.80$$

$$CI = 16.9 + (1.303)(3.80)$$

$$= 21.85 \mu\text{g/l}$$

which is < 66 $\mu\text{g/l}$

Therefore, the triwall population as a whole does not exceed the LDR standard

2. Check Number of Samples

$$n = \frac{t^2 s^2}{\Delta^2} \quad \text{where } \Delta = RT - \bar{x}$$

$\bar{x} < s^2$ therefore, must use arcsin transformation

$$RT = \frac{66}{66} = 1$$

$$\bar{x} = \frac{16.9}{66} = 0.256$$

$$s = \frac{24.6}{66} = 0.37 \quad \text{arcsin} = 21.9$$

$$\Delta = 1 - 0.256 = 0.744 \quad \text{arcsin} = 48$$

$$n = \frac{(1.303)^2 (21.9)^2}{(48)^2} = 0.35$$

which is less than the 42 samples collected. Therefore, the sample size was adequate to characterize the waste.

CLIENT: Rocky Flats	FILE NO.: 2K68 224	BY: RMN	PAGE 3 OF 6
SUBJECT: Triwalls - Ni, TCLP (Gitterete Characterization)		CHECKED BY: MPS	DATE: 7-21-92

LDR Standard = 320 ug/l

7/42 samples > standard

$$\bar{X} = 208.7 \text{ ug/l}$$

$$n = 42$$

$$S = 195.5 \text{ ug/l}$$

$$n-1 = 41$$

$$t_{.20} = 1.303$$

1. Calculate Confidence Interval

$$CI = \bar{X} \pm t_{.20} S_{\bar{X}}$$

$$\text{where } S_{\bar{X}} = \frac{S}{\sqrt{n}} = \frac{195.5}{\sqrt{42}} = 30.17$$

$$CI = 208.7 + (1.303)(30.17)$$

$$= 248.0 \text{ ug/l}$$

which is less than 320 ug/l

Therefore, the triwall population as a whole does not exceed the LDR standard.

2. Check Number of Samples

$$n = \frac{\epsilon^2 S^2}{\Delta^2} \quad \text{where } \Delta = RT - \bar{X}$$

$\bar{X} < S^2$ therefore must use arcsin transformation

$$RT = \frac{320}{320} = 1$$

$$\bar{X} = \frac{208.7}{320} = 0.652$$

$$S = \frac{195.5}{320} = 0.611 \quad \text{arcsin} = 37.7$$

$$\Delta = 1 - 0.652 = 0.348 \quad \text{arcsin} = 20.4$$

$$n = \frac{(1.313)^2 (37.7)^2}{(20.4)^2} = 5.9$$

which is less than the 42 samples collected. Therefore, the sample size was adequate to characterize the waste.

CLIENT: Rocky Flats	FILE NO.: 2K68 224	BY: RMN	PAGE 4 OF 6
SUBJECT: Triwalls - Ag, TCLP (saltcrete charac.)		CHECKED BY: MPS	DATE: 7-21-92

LDR Standard = 72 mg/l

5/42 samples > standard

$$\bar{X} = 19.57 \text{ mg/l}$$

$$n = 42$$

$$S = 35.49 \text{ mg/l}$$

$$n-1 = 41$$

$$t_{.20} = 1.303$$

1. Calculate Confidence Interval

$$CI = \bar{X} \pm t_{.20} S_{\bar{X}} \quad \text{where } S_{\bar{X}} = \frac{S}{\sqrt{n}} = \frac{35.49}{\sqrt{42}} = 5.48$$

$$CI = 19.57 + (1.303)(5.48)$$

$$= 26.7 \text{ mg/l}$$

which is less than 72 mg/l

Therefore, the triwall population as a whole has not exceed the LDR standard.

2. Check Number of Samples

$$n = \frac{t^2 S^2}{\Delta^2} \quad \text{where } \Delta = RT - \bar{X}$$

$\bar{X} < S^2$ therefore, must use arcsin transformation

$$RT = \frac{72}{72} = 1$$

$$\bar{X} = \frac{19.57}{72} = 0.272$$

$$S = \frac{35.49}{72} = 0.493 \quad \text{arcsinh} = 29.53$$

$$\Delta = 1 - 0.272 = 0.728 \quad \text{arcsinh} = 46.72$$

$$n = \frac{(1.303)^2 (29.53)^2}{(46.72)^2} = 0.68$$

which is less than the 42 samples collected. Therefore, the sample size was adequate to characterize the waste.

CLIENT: Rocky Flats	FILE NO.: 2K6B 224	BY: RMN	PAGE 5 OF 6
SUBJECT: Metals - Cadmium, TCLP (Saltcrete Char)		CHECKED BY: MPS	DATE: 7-21-02

LDR standard = 66 ug/l

2/6 samples > Standard

$$\bar{x} = 40.92 \quad n = 6$$

$$n-1 = 5 \quad t_{.20} = 1.476$$

$$s = 60.57$$

1. Calculate Confidence Interval

$$CI = \bar{x} \pm t_{.20} s_x \quad \text{where } s_x = \frac{s}{\sqrt{n}} = \frac{60.57}{\sqrt{6}} = 24.73$$

$$CI = 40.92 + (1.476)(24.73) \\ = 77.42 \text{ ug/l}$$

which is > 66 ug/l

Therefore, additional samples are needed to show that metals population is below LDR standard.

2. Number of Samples Required

$$n = \frac{\epsilon^2 s^2}{\Delta^2} \quad \text{where } \Delta = RT - x$$

$\bar{x} < s^2$ therefore, must use arcsinh transformation

$$RT = \frac{66}{66} = 1$$

$$\bar{x} = \frac{40.92}{66} = 0.62$$

$$s = \frac{60.57}{66} = 0.918 \quad \text{arcsinh} = 66.6$$

$$\Delta = 1 - 0.62 = 0.38 \quad \text{arcsin} = 22.3$$

$$n = \frac{(1.476)^2 (66.6)^2}{(22.3)^2} = 19.4 \quad \text{which is } > 6 \text{ samples collected.}$$

HALLIBURTON NUS Environmental
Corporation and Subsidiaries

STANDARD CALCULATION
SHEET

CLIENT: Rocky Flats	FILE NO.: 2K68 224	BY: RMW	PAGE 6 OF 6
SUBJECT: Metals - Ni, TCLP (Saltcrete Charac.)		CHECKED BY: MPS	DATE: 7-21-92

LDR Standard = 320 mg/l

2/6 Samples > Standard

$$\bar{x} = 713.83$$

$$n = 6$$

$$n-1 = 5$$

$$t_{.10} = 1.476$$

$$s = 1060.03$$

$\bar{x} > RT$ therefore, population exceeds LDR standard

Metals - Ag, TCLP (Saltcrete Charac.)

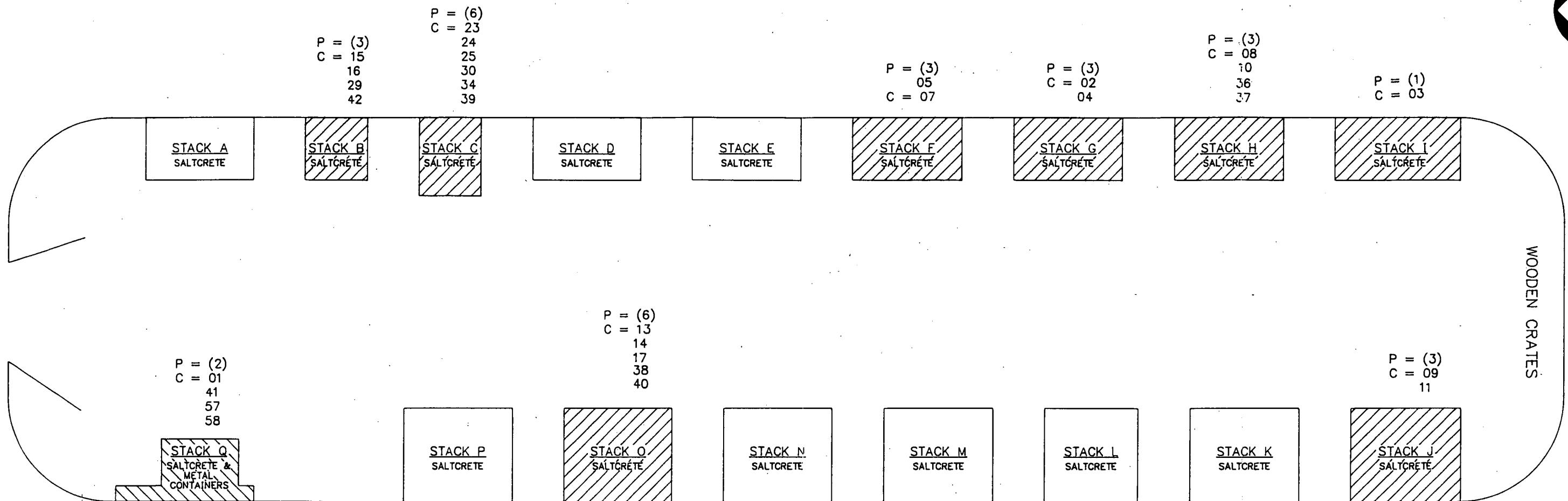
LDR Standard = 72 mg/l

2/2 Samples > Standard

$$\bar{x} = 130.5$$

$$s = 36.06$$

$\bar{x} > RT$ therefore, population exceeds LDR standard

**LEGEND**

TRI-WALL STACKS

TRI-WALLS IN METAL CONTAINERS

STATUS	SEQUENCE SAMPLE NUMBER
1. UP/UT/US	= 28
2. UT/US	= 06
3. US	= 12 AND 26

P = NUMBER OF PROPOSED SAMPLES TO BE COLLECTED BY STACK LOCATION

C = CONFIRMED STACK SAMPLE – ILLUSTRATED BY SAMPLE SEQUENCE NUMBER
(SEE TABLE A-1 THE SEQUENCE NUMBER IS THE FIRST TWO NUMBERS
IN THE SAMPLE NUMBER'S ALPHA-NUMERIC CODE)

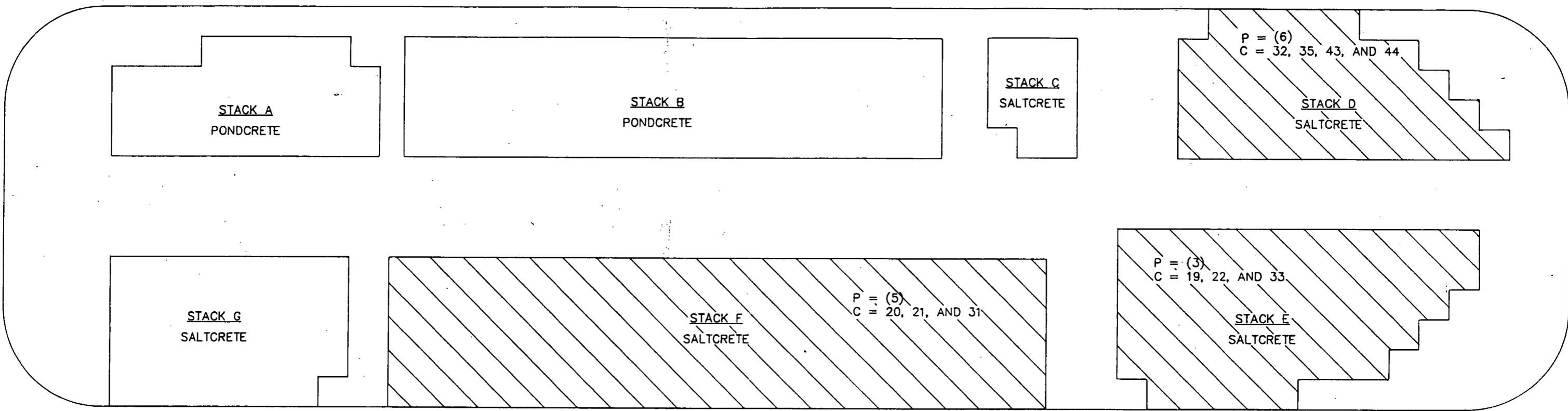
UT = UNCONFIRMED TENT NUMBER
(WITH STATUS 1 – FROM 2, 8, OR 10; WITH STATUS 2 – FROM EITHER 8 OR 10)

US = UNCONFIRMED STACK IDENTIFICATION (FROM TENT 8)

UP = UNCONFIRMED PAD NUMBER (FROM EITHER 904 OR 750)

THE PROPOSED AND CONFIRMED SEQUENCE NUMBER
OF SALTCRETE SAMPLES COLLECTED BY STACK LOCATION FROM
TENT 8, PAD 904
ROCKY FLATS COMPLEX, COLORADO
NOT TO SCALE

FIGURE A-2



LEGEND

P = NUMBER OF PROPOSED SAMPLES TO BE COLLECTED BY STACK LOCATION

C = CONFIRMED STACK SAMPLE - ILLUSTRATED BY SAMPLE SEQUENCE NUMBER
(SEE TABLE A-1 THE SEQUENCE NUMBER IS THE FIRST TWO NUMBERS
IN THE SAMPLE NUMBER'S ALPHA-NUMERIC CODE)

UT = UNCONFIRMED TENT NUMBER
(FROM 2, 8, OR 10)

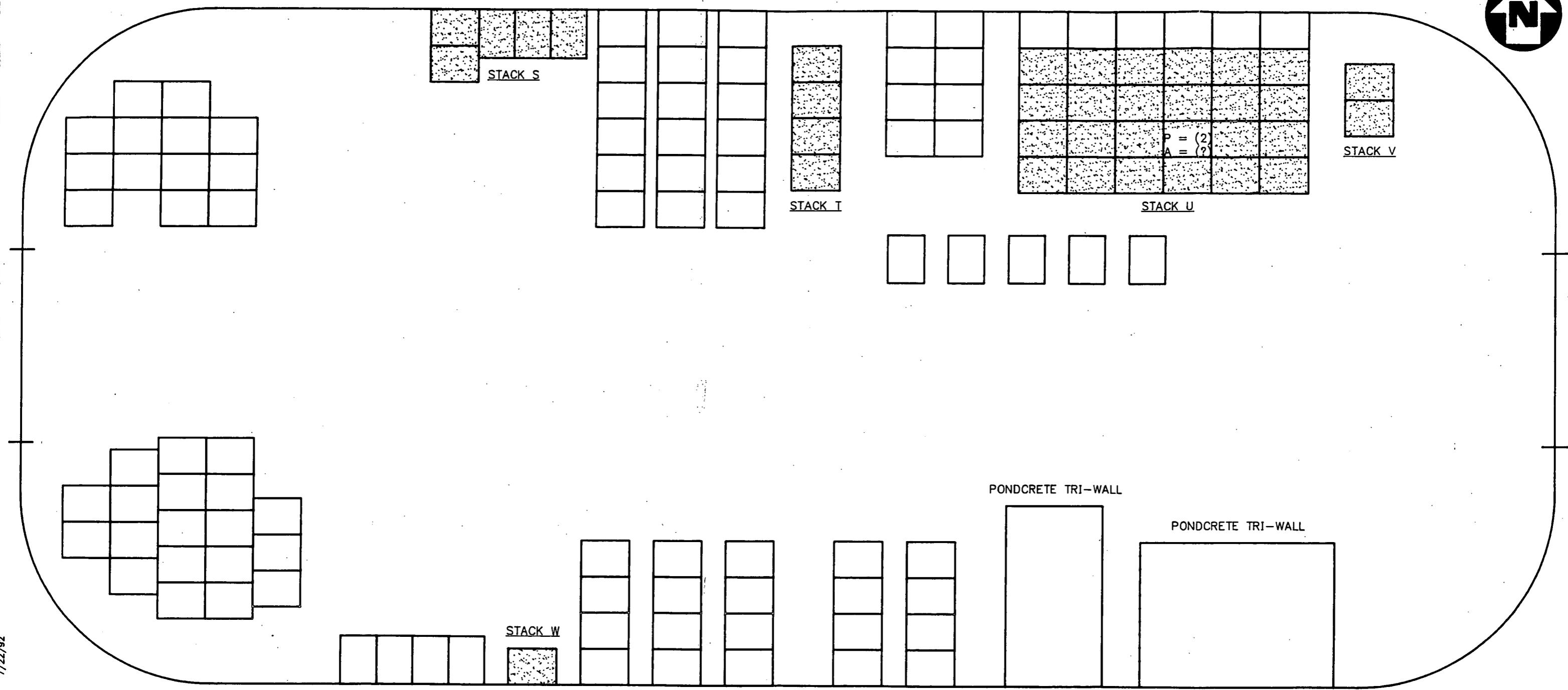
US = UNCONFIRMED STACK IDENTIFICATION (FROM TENT 2)

UP = UNCONFIRMED PAD NUMBER (FROM EITHER 904 OR 750)

STATUS	SEQUENCE SAMPLE NUMBER
1. UP/UT/US	= 28
2. US	= 18 AND 27

THE PROPOSED AND CONFIRMED SEQUENCE NUMBER
OF SALTCRETE SAMPLES COLLECTED BY STACK LOCATION FROM
TENT 2, PAD 750
ROCKY FLATS COMPLEX, COLORADO
NOT TO SCALE

FIGURE A-4

ACAD-2K68V-PLANS.DWG
7/22/92

THE PROPOSED AND ACTUAL NUMBER
OF SALTCRETE SAMPLES COLLECTED BY
STACK LOCATION FROM TENT 6, PAD 750
ROCKY FLATS, COMPLEX, COLORADO

NOT TO SCALE



SALTCRETE HALF CRATE

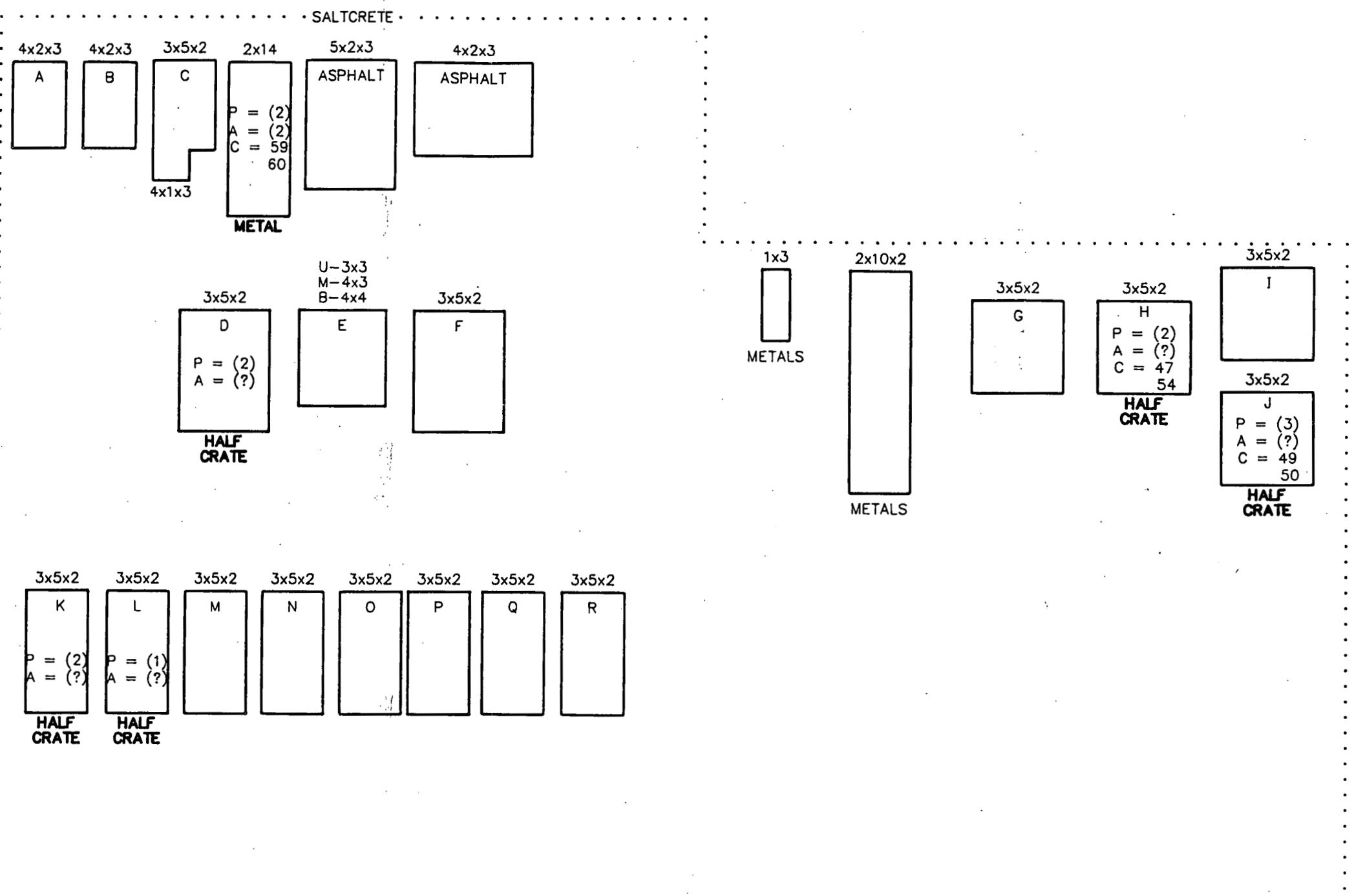
P = NUMBER OF PROPOSED SAMPLES TO BE
COLLECTED BY STACK LOCATION

A = ACTUAL NUMBER OF SAMPLES COLLECTED

NOTES

1. SAMPLE SEQUENCE NUMBER IS THE FIRST TWO NUMBERS IN THE SAMPLE NUMBER'S ALPHA-NUMERIC CODE (SEE TABLE A-1)
2. HALF CRATE SAMPLES WITH SEQUENCE NUMBERS 45, 46, 48, 51, 52, 53, 55, AND 56 HAVE AN UNCONFIRMED STACK IDENTIFICATION STATUS AND COULD BE EITHER FROM THE SOUTH LAYDOWN AREA OR TENT 6.

FIGURE A-5HALLIBURTON NUS
Environmental Corporation



THE PROPOSED AND ACTUAL NUMBER
OF SALTCRETE SAMPLES COLLECTED BY
STACK LOCATION FROM THE SOUTH
LAYDOWN AREA, PAD 750
ROCKY FLATS, COMPLEX, COLORADO

FIGURE A-6